Cornell University

ANNOUNCEMENTS

Graduate School of *Nutrition*

1970-71

Cornell University

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The Graduate School of Nutrition, a unit of Cornell University, is supported in part by state appropriations through the State University of New York

Cornell Academic Calendar

	1970–71*
Registration, new and rejoined students	Th, Sept. 10
Registration, old students	F, Sept. 11
Fall term instruction begins, 7:30 A.M.	M, Sept. 14
Midterm grade reports due	S, Oct. 24
Thanksgiving recess:	
Instruction suspended, 1:10 P.M.	W, Nov. 25
Instruction resumed, 7:30 A.M.	M, Nov. 30
Fall term instruction ends, 1:10 P.M.	S, Dec. 19
Christmas recess	
Independent study period begins	M, Jan. 4
Final examinations begin	M, Jan. 11
Final examinations end	T, Jan. 19
Intersession begins	W, Jan. 20
Registration, new and rejoined students	Th, Jan. 28
Registration, old students	F, Jan. 29
Spring term instruction begins, 7:30 A.M.	M, Feb. 1
Deadline: changed or make-up grades	M, Feb. 8
Midterm grades due	S, Mar. 13
Spring recess:	
Instruction suspended, 1:10 P.M.	S, Mar. 27
Instruction resumed, 7:30 A.M.	M, Apr. 5
Spring term instruction ends, 1:10 P.M.	S, May 15
Independent study period begins	M, May 17
Final examinations begin	M, May 24
Final examinations end	T, June 1
Commencement Day	M, June 7
Deadline: changed or make-up grades	M, June 14

* The dates shown in the Academic Calendar are subject to change at any time by official action of Cornell University.

CORNELL UNIVERSITY ANNOUNCEMENTS

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Contents

The courses and curricula described in this *Announcement,* and the teaching personnel listed therein, are subject to change at any time by official action of Cornell University.

GRADUATE SCHOOL OF NUTRITION

UNIVERSITY ADMINISTRATION

Dale R. Corson, President of the University
Robert A. Plane, Acting University Provost
Mark Barlow, Jr., Vice President for Student Affairs
Stuart M. Brown, Jr., Vice President for Academic Affairs
John E. Burton, Vice President–Business
Lisle C. Carter, Jr., Vice President for Social and Environmental Studies
W. Donald Cooke, Vice President for Research
Lewis H. Durland, University Treasurer
W. Keith Kennedy, Vice Provost
E. Hugh Luckey, Vice President for Medical Affairs
Thomas W. Mackesey, Vice President for Planning
Paul L. McKeegan, Director of the Budget
Robert D. Miller, Dean of the University Faculty
Steven Muller, Vice President for Public Affairs
Arthur H. Peterson, University Controller
Neal R. Stamp, Secretary of the Corporation and University Counsel

ADMINISTRATION OF THE GRADUATE SCHOOL OF NUTRITION

Dale R. Corson, President of the University
Robert A. Plane, Acting University Provost
Stuart M. Brown, Jr., Vice President for Academic Affairs of the University
Richard H. Barnes, Dean of the School
Charlotte M. Young, Secretary of the School

FACULTY

More than fifty professors are on the faculty of the Graduate School of Nutrition. Most hold joint appointments in the School and have their main affiliation in other colleges at the University. The core faculty includes those professors whose primary appointments are in the Graduate School of Nutrition.

Joint Faculty

The titles and the departments (or sections) of primary affiliation of faculty members are indicated.

Armbruster, Gertrude D., Ph.D., Associate Professor, Human Nutrition and Food

Uris Library, with its clock tower, and Olin Research Library (right) are two of the several large libraries on the Cornell campus.

Baker, Robert C., Ph.D., Professor, Poultry Science
Bensadoun, André, Ph.D., Associate Professor, Poultry Science
Buck, Paul A., Ph.D., Associate Professor, Food Science and Technology
Comar, Cyril L., Ph.D., Professor, Physical Biology
Daniel, Louise J., Ph.D., Professor, Biochemistry
Devine, Marjorie M., Assistant Professor, Human Nutrition and Food
Finn, Robert K., Ph.D., Professor, Chemical Engineering
Hackler, L. Ross, Ph.D., Associate Professor, Food Science and Technology, Geneva
Hartman, John D., Ph.D., Professor, Vegetable Crops
Hester, E. Elizabeth, Ph.D., Professor, Human Nutrition and Food
Hogue, Douglas E., Ph.D., Associate Professor, Animal Science
Isenberg, F.M.R., Ph.D., Professor, Vegetable Crops
Krook, Lennart, D.V.M., Ph.D., Professor, Veterinary Pathology
Lengemann, Frederick W., Ph.D., Professor, Physical Biology
Loosli, John K., Ph.D., Professor, Animal Science
Mattick, Leonard R., Ph.D., Associate Professor, Food Science and Technology, Geneva
Merrill, William G., Ph.D., Associate Professor, Animal Science
Mondy, Nell, Ph.D., Associate Professor, Human Nutrition and Food
Morrison, Mary A., Ph.D., Professor, Human Nutrition and Food
Moyer, James C., Ph.D., Professor, Food Science and Technology, Geneva
Nelson, Walter L., Ph.D., Professor, Biochemistry
Nesheim, Malden C., Ph.D., Associate Professor, Poultry Science
Newman, Katherine J., Ph.D., Associate Professor, Human Nutrition and Food
Pond, Wilson G., Ph.D., Associate Professor, Animal Science
Reid, John T., Ph.D., Professor, Animal Science
Rivers, Jerry Margaret, Ph.D., Associate Professor, Human Nutrition and Food
Robinson, Willard B., Ph.D., Professor, Food Science and Technology, Geneva
Scott, Milton L., Ph.D., Professor, Poultry Science
Seeley, Harry W., Jr., Ph.D., Professor, Microbiology
Shallenberger, Robert S., Ph.D., Professor, Food Science and Technology, Geneva
Smith, Sedgwick E., Ph.D., Professor, Animal Science
Smock, Robert M., Ph.D., Professor, Pomology
Snook, Jean T., Ph.D., Assistant Professor, Human Nutrition and Food
Steinkraus, Keith H., Ph.D., Professor, Food Science and Technology, Geneva
Turk, Kenneth L., Ph.D., Professor, Animal Science
VanBuren, Jerome P., Ph.D., Associate Professor, Food Science and Technology, Geneva
Visek, Willard J., Ph.D., M.D., Professor, Animal Science
Warner, Richard G., Ph.D., Professor, Animal Science
Wasserman, Robert H., Ph.D., Professor, Physical Biology
Wellington, George H., Ph.D., Professor, Animal Science
Williams, Harold H. Ph.D., Professor, Biochemistry

Winick, Myron J., M.D., Associate Professor, Pediatrics, Cornell Medical College, New York City
Young, Robert J., Ph.D., Professor, Poultry Science

Core Faculty, Graduate School of Nutrition

Graduate Fields with which these professors are affiliated are in italics.

Barnes, Richard H., Ph.D., Professor, *Nutrition*
Call, David L., Ph.D., H.E. Babcock Professor of Food Economics, *Agricultural Economics*
Gaylor, James L., Ph.D., Professor, *Biochemistry,* and *Nutrition*
Latham, Michael C., M.D., Professor, *Nutrition*
Lutwak, Leo, Ph.D., M.D., James Jamison Professor of Clinical Nutrition, *Food and Nutrition, Nutrition,* and *Physiology*
Maynard, Leonard A., Ph.D., Professor Emeritus
McCormick, Donald B., Ph.D., Professor, *Biochemistry,* and *Nutrition*
Roe, Daphne A., M.D., Assistant Clinical Professor, *Food and Nutrition,* and *Nutrition*
Simko, Vladimir, M.D., Visiting Assistant Clinical Professor
Wright, Lemuel D., Ph.D., Professor, *Biochemistry,* and *Nutrition*
Young, Charlotte M., Ph.D., Professor, *Food and Nutrition,* and *Nutrition*
Zilversmit, Donald B., Ph.D., Professor, *Physiology,* and *Biochemistry*


SAVAGE HA
NUTRITION

Cornell University

GRADUATE SCHOOL OF NUTRITION

The Graduate School of Nutrition was founded in 1941 to provide graduate training and research opportunities in nutrition at Cornell. Although graduate programs in nutrition are now available in other departments of the University, the Graduate School of Nutrition offers its own broad academic program designed not only as a final preparation for students who, after graduation, wish to work in the area of nutritional or food science, but also as an excellent background for students who are deciding upon a specific area for doctoral training in nutrition or a related science. Special instruction is available to students whose previous academic training has not necessarily been in the area of nutrition.

In the past, nutrition was the study of the relationships between the biological sciences and the intact organism, in the healthy or diseased state. The concept of nutrition today also embraces many more disciplines including the behavioral sciences, food technology, economics, and education. Appreciating the fact that the science of nutrition cannot exist separately from fundamental biochemistry, the research and training programs of the Graduate School of Nutrition have for some time been aligned with heavy emphasis on biochemistry in areas ranging from the study of enzymological phenomena at the subcellular level to the direct application of biochemical principles in animals and man.

In recent years, the interdependence of the nutritional and social sciences has been more fully recognized; therefore, in addition, the research programs at the School now include such studies as the effect of early nutrition on behavioral development and investigations of the complex social, cultural, and economic factors which influence nutritional practices and contribute to the vast problem of malnutrition during early life.

NUTRITION PROGRAMS AT CORNELL

The existence of three separate graduate programs in nutrition accounts for the continued strength and diversity of nutritional science at the

e Hall, home of the Graduate School of Nutrition.

University. First, the Graduate Field of Nutrition includes all Cornell faculty members who are qualified to direct graduate students toward the M.S. or Ph.D. degree in the many biological subdivisions of nutrition. Second, the Graduate Field of Food and Nutrition is staffed mainly by faculty members from the New York State College of Human Ecology and offers another program which also leads to the M.S. or Ph.D. degree. Finally, the Graduate School of Nutrition offers the professional degree programs described in this *Announcement,* and it grants the degrees of Master of Nutritional Science (M.N.S.) and Master of Food Science (M.F.S.). The professional degree program differs from the M.S. degree programs primarily in that the professional degrees are planned as terminal degrees, and therefore more attention is given to breadth of background in a variety of academic subjects than is usually the case in the curriculum leading to the M.S. degree. However, many students who have obtained the excellent training of the M.N.S. or M.F.S. degree continue to a Ph.D. degree. In addition to a core faculty of the Graduate School of Nutrition, the faculty of a number of departments and divisions of the University are drawn upon to provide counseling and instruction in the School's programs.

THE FACULTY

A faculty of more than fifty professors serves the Graduate School of Nutrition to make possible the School's extensive program. Most of the faculty members hold joint appointments in the Graduate School of Nutrition but have their primary affiliation in other colleges at Cornell. The core faculty includes those professors whose primary appointments are in the School. Among the core faculty members are biochemists working in research areas from subcellular enzymology to the more direct application of biochemistry to the nutritional status of the intact organism; clinicians conducting continuous metabolic studies of a variety of clinical conditions; experimental nutritionists and experimental psychologists using animals to replicate some of the more serious problems of malnutrition in man; public health nutritionists training students for careers in community nutrition; and experts in international nutrition conducting research and training students in those areas of nutrition that are, to some extent, characteristic of the developing countries of the world.

The complete faculty of the School also includes animal nutritionists, food economists, food scientists, and specialists in other areas related to agriculture and home economics.

Core faculty offices and laboratories are located in Savage Hall and in its Clinical Nutrition Unit in Cornell's Sage Infirmary.

CURRICULUM AND DEGREES

The Graduate School of Nutrition offers two professional degrees, Master of Nutritional Science (M.N.S.) and Master of Food Science

(M.F.S.). Considering the many disciplines associated with nutrition, these Master's degree programs are designed to be academically strong and professionally useful. The caliber of positions held by graduates reflects the quality of training received. The student obtains a firm foundation in the sciences basic to his chosen area of specialization, as well as practical preparation, through carefully selected courses and a special research problem, for work in his professional career. Each student selects a faculty adviser in whose area of specialization his own interests lie. An adviser may be selected from among those on the entire faculty, however, members of the core faculty serve as advisers more frequently. The adviser plans the curriculum and directs the student's special research problem, which includes a prepared report of thesis quality. The curriculum is designed to meet the student's particular needs according to his educational background, area of graduate study, and professional goals after graduation.

Students completing the M.N.S. or M.F.S. degree also have excellent training for more advanced study. Many continue to a Ph.D. degree in such Fields as Biochemistry, Physiology, Food Science and Technology, and Nutrition (animal or human). Numerous students have found the Master's degree programs particularly helpful in the selection of an area of graduate study leading to the Ph.D. degree and have used the M.N.S. degree program as a stepping-stone when their future ambitions were not yet established.

Master of Nutritional Science

One of the strengths of the School, not found in many other institutions, is that training for the M.N.S. degree is provided in a number of specializations. Among these are:

nutritional biochemistry
experimental animal nutrition
clinical nutrition
public health nutrition
international nutrition

The basic training for the degree emphasizes the physical and biological sciences and the basic principles of nutrition. Through an appropriate curriculum planned by his adviser, the student learns to apply these basic principles in the particular specialization in which he wishes to become proficient. Experience in a laboratory or in field work usually becomes the basis of the special research problem report. Facilities for research include biochemical, microbiological, and physiological laboratories, experimental animal quarters, a diet table for experimental work in human studies, and a metabolic unit in Cornell's Sage Infirmary for the study of nutrition in relation to disease.

Since two of the specializations, public health nutrition and international nutrition, involve special arrangements for field experience rather than laboratory training, they will be described in more detail.

PUBLIC HEALTH NUTRITION

Special opportunities are provided for students of appropriate background who want to work as community nutritionists with health and

welfare agencies. In this specialization, the curriculum includes certain phases of the social sciences, education, clinical and public health nutrition, and appropriate information service techniques. Students accepted for training in this area gain further insight into public health nutrition by spending a two-month summer period in "in-service" nutritional training as applied to the community and to public health under the supervision of a qualified public health nutritionist. Assistance will be given in making the necessary contacts to obtain a training program directed by a qualified nutritionist. Students must be prepared to defray living costs. These field assignments may form the basis for a portion of the required report on an individual's research problem.

INTERNATIONAL NUTRITION

The School offers a program in international nutrition to meet the need for professionally trained men and women to work for government and international agencies in those developing countries where malnutrition and undernutrition exist. The program includes courses in the sciences basic to nutrition that are extensive enough to equip students for a variety of careers in nutrition. Emphasis in electives is then placed on specialized study in problems and programs in international nutrition and related areas such as agriculture, public health, extension teaching, sociology, anthropology, demography, economics and nutrition education. It is usually possible for students to obtain supervised field experience in a nutrition program in a developing country for two or three months. Several traineeships and assistantships are available to qualified students. For further details, request the leaflet *Program in International Nutrition* from the Graduate School of Nutrition.

Master of Food Science

Growing emphasis on food production—its availability, quality, processing and packaging, as well as its nutritive value—indicates a need for those trained in food science. To meet this need the Graduate School of Nutrition offers an M.F.S. program.

Since all techniques for food processing and handling must be based on a thorough knowledge of food characteristics, the M.F.S. program emphasizes the sciences fundamental to the field: food chemistry, biochemistry, and bacteriology. The student who masters these sciences may easily learn the details of special food techniques on the job. Therefore, the basic academic program does not include training in specialized technology but rather the science courses involved with food processing, packaging, and similar areas.

A student becomes acquainted with the several research projects in process, including studies of food spoilage, flavor, composition, presentation, fermentation, and irradiation effects. He then chooses a staff adviser in whose area his own interests lie. Work on the required special research problem may be conducted at the Ithaca campus or at the New York State Agricultural Experiment Station at Geneva, New York, depending on the type of research problem selected.

The Ph.D. Degree at Cornell

At Cornell, all graduate programs for the Ph.D. degree are under the jurisdiction of the Graduate School of the University and are directed by Fields. Faculty members of the Graduate School of Nutrition are members of certain Fields of the Graduate School, such as Biochemistry, Nutrition, Food and Nutrition, Food Science and Technology, Physiology and Agricultural Economics. The academic background of a professor determines the Field in which he is appointed.

Graduate training and research are major responsibilities of the core faculty of the Graduate School of Nutrition. It is through this faculty and the research they conduct that training for the Ph.D. degree is carried out in the School. More than half of the students completing Master's degrees at the School continue toward a Ph.D. degree with the advantage of doing so without disturbing the continuity of their studies. Often a Ph.D. candidate continues to work with his original adviser because the student has a research interest developed through close association with his professor during the Master's degree program.

Postdoctoral Studies

As in all scholarly pursuits, training in research does not end with a doctoral degree. It is becoming more and more common for students receiving the Ph.D. degree in the natural sciences to continue their training in research for one or two postdoctoral years. Mature scientists also frequently seek an opportunity to revitalize their research programs, using sabbatical or other types of leaves from their home institutions to come here for additional research experience. Thus there are always some of these scientists working at the postdoctoral level at the Graduate School of Nutrition; not only do they gain from the experience, but their presence here is stimulating to the staff and students of the School.

ADMISSION REQUIREMENTS[1]

To be admitted to a Master of Nutritional Science or a Master of Food Science degree program in the Graduate School of Nutrition, an applicant must hold a baccalaureate degree from a college or university of recognized standing, or have completed work equivalent to that required for such a degree at Cornell. (Specific academic requirements for admission are outlined on p. 14) He must show promise of ability to pursue advanced study and research satisfactorily, as judged by his previous record. To enter graduate study the applicant must also have adequate preparation and a definite interest in his chosen field of

1. It is the policy of Cornell University actively to support the American ideal of equality of opportunity for all, and no student shall be denied admission or be otherwise discriminated against because of race, color, creed, religion, or national origin.

specialization, although his previous academic training need not necessarily be in the area of nutrition.

All applicants for admission and fellowship consideration are urged to take the Graduate Record Examination (GRE) Aptitude Tests (Verbal and Quantitative) of the Educational Testing Service, and to have the scores sent to the Cornell Graduate School as part of their application materials. Information about the times and places of test administrations may be obtained directly from the Educational Testing Service, Princeton, New Jersey 08540.

English Proficiency Requirement

Foreign applicants whose native language is not English and who have not received their secondary school or university education in the English language must take the Test of English as a Foreign Language by arrangement with Educational Testing Service, Princeton, New Jersey 08540, U.S.A., or the Michigan English Language Test by arrangement with the English Language Institute, University of Michigan, Ann Arbor, Michigan 48104, U.S.A. The test scores must be reported directly by the testing organization to the Graduate School as part of the essential application information, and no final action on applications will be taken until the scores have been received. Both testing programs are available throughout the world. Information on times and places for administration of the tests may be obtained directly from the addresses given above. Since these tests are diagnostic, admission to those applicants whose scores indicate unsatisfactory command of English may be denied or may be made contingent upon evidence of improved command of English.

If English has been the medium of instruction in the secondary school or university, a statement to this effect signed by a responsible officer of a United States Embassy or Consulate or by an appropriate official of the educational institution involved should be sent to the Graduate School.

Academic Requirements

To qualify for admission, an applicant must have completed, with an above average record, courses in one of the following groups of subjects with the approximate number of semester hours as stated. A weekly one-hour lecture per fifteen-week term is approximately equal to one semester hour credit. An applicant who cannot meet in full the specific course requirements may be admitted if the faculty of the School so recommends, with the understanding that the deficiencies must be made up before graduation without credit toward the degree. Academic requirements for admission depend on whether the student wants to concentrate on the biological aspects of nutrition (e.g. nutritional biochemistry, experimental animal nutrition or clinical nutrition) or on the social science aspects of nutrition (e.g. international nutrition or public health nutrition).

Dean Barnes discusses a research proble

REQUIREMENTS FOR APPLICANTS CONCENTRATING ON BIOLOGICAL ASPECTS OF NUTRITION

Courses in quantitative or organic chemistry, or elementary courses in physics, microbiology or physiology, taken following admission to complete entrance requirements, cannot be counted toward graduation.

PHYSICAL SCIENCES. A total of twenty semester hours divided among chemistry, physics, and mathematics are required. Courses in quantitative chemistry and organic chemistry are prerequisites to courses required for graduation. If they are not offered for entrance, they must be taken following admission. Students who enter without college training in physics are required to take an elementary course in that subject before graduation.

BIOLOGICAL SCIENCES. A total of twelve hours in such courses as biology, botany, zoology, microbiology, and physiology are required. Courses in animal or human nutrition may be counted (up to three credit hours) in the biological sciences. An elementary course in microbiology is prerequisite for advanced courses in microbiology.

SOCIAL STUDIES. A total of nine hours in such subjects as economics, government, education, psychology, anthropology, and history must be offered for entrance.

OTHER COURSES. The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by the candidate for a degree.

RECOMMENDED COURSES FOR ENTRANCE

Students who have completed the above entrance requirements prior to receiving a baccalaureate degree are urged to take as many as possible of the following subjects in order to be better prepared for some of the more advanced courses required for graduation: physical chemistry, calculus, a good background in courses related to physiology (e.g. zoology, comparative anatomy, embryology), and/or two terms of organic chemistry.

REQUIREMENTS FOR APPLICANTS CONCENTRATING ON SOCIAL SCIENCE ASPECTS OF NUTRITION

Courses in quantitative or organic chemistry, or elementary courses in physics, microbiology, or physiology, taken following admission to complete entrance requirements, cannot be counted toward graduation.

PHYSICAL SCIENCES. A total of sixteen semester hours divided among chemistry, physics and mathematics are required. A course in organic chemistry is prerequisite to courses required for graduation. If it is not offered for entrance, it must be taken following admission. Students who enter without college training in physics are required to take an elementary course in that subject before graduation.

BIOLOGICAL SCIENCES. A total of nine hours in such courses as biology, botany, zoology, microbiology, and physiology are required. Courses in animal or human nutrition may be counted (up to three

credit hours) in the biological sciences. An elementary course in microbiology is prerequisite for advanced courses in microbiology.

SOCIAL STUDIES. A total of twelve hours in such subjects as economics, government, education, psychology, anthropology, and history must be offered for entrance.

HUMANITIES. A total of four hours in such subjects as English, other languages, classics, and arts are required.

OTHER COURSES. The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by a candidate for a degree.

RECOMMENDED COURSES FOR ENTRANCE see p. 16

Nondegree Applicants

When staff and facilities are available, some applicants who do not intend to work toward an advanced degree at Cornell may be admitted. Normally such students wish to achieve particular objectives by taking courses and special training in graduate nutrition programs. In order to be admitted to a nondegree program, a student should have a Bachelor's degree although, with appropriate justification, this requirement may be waived. These special students are not subject to the standard course requirements for admission to the Graduate School of Nutrition, nor to requirements for course work to be completed for graduate degrees. Registration in such a program is restricted to two semesters.

University Health Requirements

The following health requirements for entering graduate students have been adopted by the Cornell Board of Trustees. Failure to fulfill these requirements will result in loss of the privilege of registering the following term. The responsibility for fulfilling these requirements rests with the student.

IMMUNIZATION. A satisfactory certificate of immunization against smallpox, on the form supplied by the University, must be submitted before registration. It will be accepted as satisfactory only if it certifies that within the last three years a successful vaccination has been performed. If this requirement cannot be fulfilled by the student's home physician, opportunity for immunization will be offered by the Cornell medical staff during the student's first semester, with the cost to be borne by the student. If a student has been absent from the University for more than three years, immunity will be considered to have lapsed, and a certificate of revaccination must be submitted.

It is strongly recommended by the University Health Services that all graduate students have immunization against tetanus before entering the University. All graduate students may, however, obtain initial and all booster tetanus toxoid immunizations at the Gannett Clinic for a nominal charge.

HEALTH HISTORY. Graduate students, when accepted, must submit health histories on forms supplied by the University. These should be returned promptly to the Gannett Medical Clinic. A University physician will review the material before it becomes part of the student's permanent health record. All information given is confidential. After arrival at Cornell, if the medical history indicates a need, a student will be given an appointment to consult a physician at the Clinic. When a student has been away from the University for more than a year, he must, upon reentrance, submit an interim health history on a University form.

X RAY. Every student is required to have a chest x ray. Opportunity is given to satisfy this requirement during the student's first week on campus. The cost of the x-ray examination is included in the General Fee. When a student who has been away from the University for more than a year wishes to reenter, he must, at his own expense, again fulfill the chest x-ray requirement.

Applications and Registration

Applicants for admission should address their inquiries to the Office of the Graduate School, Sage Graduate Center, Cornell University, Ithaca, New York 14850. The form the applicant will receive is one which is used in all areas of graduate study and does not apply in all of its details to Graduate School of Nutrition applicants. In completing the form, applicants should indicate an interest in either *nutritional science for the M.N.S. degree or food science for the M.F.S. degree in the Graduate School of Nutrition.* In neither program is it necessary to indicate a minor area of study. No application will be acted upon until all credentials enumerated in the application form have been filed.

All students admitted to the Graduate School of Nutrition must register through the Graduate School office, Sage Graduate Center, at the beginning of each term or session.

REQUIREMENTS FOR GRADUATION

The degrees of Master of Nutritional Science (M.N.S.) and Master of Food Science (M.F.S.) are awarded by the Cornell University Graduate School after satisfactory completion of a special research problem and courses considered basic to an understanding of nutritional or food science.

For graduation a student must have completed the necessary residence requirements (p. 26) and have obtained a cumulative grade average of at least a B— in a minimum of thirty-two semester hours of specified and approved courses. An additional six semester hours must be completed in a special research problem. A weekly one-hour lecture per fifteen-week term is approximately equal to one semester hour credit. The student must prepare a written report on this approved special research problem and must pass a final oral examination on the report and related course work.

To round out the professional training in nutritional or food science, the student's adviser and the faculty of the Graduate School of Nutrition may require him to take certain courses deemed appropriate to his area of interest. In the event that certain required courses have been satisfactorily completed by the student prior to his entrance to the School, substitutions will be made with the approval of his adviser.

The curriculum differs in accordance with the field in which the student specializes as follows:

Nutritional Science

Faculty advising students for the M.N.S. degree include Professors R. H. Barnes, A. Bensadoun, D. L. Call, C. L. Comar, Louise J. Daniel, Marjorie M. Devine, J. L. Gaylor, L. R. Hackler, D. E. Hogue, L. Krook, M. C. Latham, F. W. Lengemann, J. K. Loosli, L. Lutwak, D. B. McCormick, W. G. Merrill, Mary A. Morrison, W. L. Nelson, M. C. Nesheim, Katherine J. Newman, W. G. Pond, J. T. Reid, Jerry M. Rivers, Daphne A. Roe, M. L. Scott, S. E. Smith, Jean T. Snook, K. L. Turk, W. J. Visek, R. G. Warner, R. H. Wasserman, H. H. Williams, M. J. Winick, L. D. Wright, Charlotte M. Young, R. J. Young, and D. B. Zilversmit.

The minimum curriculum to be completed, including the number of semester hours required and courses generally taken to fulfill the requirement depends on whether the student wishes to concentrate on the biological aspects of nutrition (e.g. nutritional biochemistry, experimental animal nutrition, or clinical nutrition) or on the social science aspects of nutrition (e.g. international nutrition or public health nutrition).

Summary of academic requirements for graduation:

	Semester Hours
Biochemistry	4
Principles of nutrition	3
Laboratory work in nutrition	3
Advanced physiology	3
Food economics	3
Statistics	3
Seminars	1
Advanced courses in nutrition	3
International or public health nutrition	3
Additional courses*	6
Special problem	6
	38

* To fill this requirement students concentrating on the biological aspects of nutrition will be required to do a laboratory course in biochemistry (three semester hours) and additional advanced physiology (three semester hours). Students concentrating on the social science aspects of nutrition will take approved graduate courses in the social sciences to fill this requirement (six semester hours).

Minimum curriculum to be completed, including semester hours required, and courses generally taken to fill the requirement:

(A) FOR STUDENTS CONCENTRATING ON THE BIOLOGICAL ASPECTS OF NUTRITION

BIOCHEMISTRY. Seven semester hours. Students generally take Biological Sciences 431 and 432 or 531 and 532. Other courses approved to fill this requirement are listed in the Biochemistry section of the Description of Courses (p. 39).

PRINCIPLES OF NUTRITION. Three semester hours. One of the following courses is generally taken: Human Nutrition and Food 332 (p. 37), Animal Science 410 (p. 38), or Graduate School of Nutrition 620 (p. 35).

LABORATORY WORK IN NUTRITION. Three semester hours. Students generally take Animal Science 511 (p. 39) or Human Nutrition and Food 524 (p. 38).

ADVANCED PHYSIOLOGY. Six semester hours. Students generally take Biological Sciences 414 (p. 43).

FOOD ECONOMICS. Three semester hours. Students generally take Graduate School of Nutrition 590 (p. 51).

STATISTICS. Three semester hours. One of the following courses is usually taken: Statistics and Biometry 510 or 511, or Industrial and Labor Relations 510 (p. 45).

SEMINARS. One semester hour. Students generally take Graduate School of Nutrition 700 (p. 57).

SPECIAL PROBLEM. Six semester hours. Graduate School of Nutrition 710 (see p. 25 for details).

INTERNATIONAL NUTRITION OR PUBLIC HEALTH NUTRITION. Three semester hours. Students generally take Graduate School of Nutrition 580 or 650.

ADVANCED COURSES IN NUTRITION. Three semester hours. Courses approved for this credit are listed below in the order found in the Description of Courses (p. 36):

		Semester Hours
Human Nutrition and Food 501	Proteins and Amino Acids	2
Poultry Science 502	Lipids and Carbohydrates	2
Animal Science 503	Nutritional Energetics	2
Poultry Science 504	Minerals and Essential Inorganic Elements	2
Veterinary Pathology 931	Pathology of Nutritional Diseases	3
Graduate School of Nutrition[b] 580	International Nutrition Problems, Policy, and Programs	3
Graduate School of Nutrition[b] 650	Clinical and Public Health Nutrition	3
Human Nutrition and Food[a] 332	Principles of Human Nutrition	3
Human Nutrition and Food 441	Nutrition and Disease	3
Human Nutrition and Food 512	Nutrition and Growth	2
Human Nutrition and Food 514	Readings in Nutrition	3
Animal Science[c] 510	Special Topics in Animal Nutrition	1
Biological Sciences 530	Biochemistry of the Vitamins	2
Biological Sciences 633–638	Advanced Biochemistry Series	1 to 6

[a] Approved for credit if not taken previously to fulfill Principles of Nutrition requirement.
[b] Approved for credit if not taken previously to fulfill International Nutrition or Public Health Nutrition requirement.
[c] Approved for credit only if suitable topic.

(B) FOR STUDENTS CONCENTRATING ON THE SOCIAL SCIENCE ASPECTS OF NUTRITION

BIOCHEMISTRY. Four semester hours. Students generally take Biological Science 431. Other courses approved to fill this requirement are listed in the Biochemistry section of the Description of Courses (p. 39).

PRINCIPLES OF NUTRITION. Three semester hours. One of the following courses is generally taken: Human Nutrition and Food 332 (p. 37), Animal Science 410 (p. 38), or Graduate School of Nutrition 620 (p. 35).

LABORATORY WORK IN NUTRITION. Three semester hours. Students generally take Animal Science 511 (p. 39) or Human Nutrition and Food 524 (p. 38).

ADVANCED PHYSIOLOGY. Three semester hours. Courses which fill this requirement are listed on pp. 42–44.

FOOD ECONOMICS. Three semester hours. Students generally take Graduate School of Nutrition 590 (p. 51).

STATISTICS. Three semester hours. One of the following courses is usually taken: Statistics and Biometry 510 or 511, or Industrial and Labor Relations 510 (p. 45).

SEMINARS. One semester hour. Students generally take Graduate School of Nutrition 700 (p. 57).

SPECIAL PROBLEM. Six semester hours. Graduate School of Nutrition 710. (See p. 25 for details.)

ADVANCED COURSES IN NUTRITION. Three semester hours. Courses approved for this credit are the same as those approved for students concentrating on the biological aspects of nutrition (see p. 22).

INTERNATIONAL NUTRITION OR PUBLIC HEALTH NUTRITION. Three semester hours. Students generally take Graduate School of Nutrition 580 or 650.

SOCIAL SCIENCES. Six semester hours. Only graduate courses are approved to fill this requirement. Three semester hours are normally in demography (Sociology 530, 531, or 535), and three semester hours in some other area of social studies (Developmental Sociology 411, 515, 516, or 528; Sociology 541; Anthropology 423, 432, 434, 436, or 441; Agricultural Economics 441, 443, 446, 450, 464, 642, 664, 665, 667, or 668; Education 524, 525, 626, or 627; Economics 561 or 565).

These are minimum course requirements for the M.N.S. degree and are normally supplemented with additional courses.

Food Science

The specialized training in this area, leading to the degree of Master of Food Science, emphasizes the sciences involved in food processing and utilization.

Faculty advising students for the M.F.S. degree include Professors Gertrude D. Armbruster, R. C. Baker, P. A. Buck, R. K. Finn, J. D. Hartman, Elizabeth E. Hester, F. M. R. Isenberg, L. R. Mattick, Nell Mondy, J. C. Moyer, W. B. Robinson, H. W. Seeley, R. S. Shallenberger, R. M. Smock, K. H. Steinkraus, J. P. VanBuren and G. H. Wellington.

The curriculum to be completed including the number of semester hours required and courses generally taken to fulfill the requirement follows:

BIOCHEMISTRY. Seven semester hours. Courses approved to fulfill this requirement are listed in the Biochemistry section of the Description of Courses (p. 39).

ADVANCED COURSES IN BACTERIOLOGY. Six semester hours. Courses approved to fulfill this requirement are listed in the Food Science and Microbiology section of the Description of Courses (p. 49).

STATISTICS. Three semester hours. One of the following courses is usually taken: Statistics and Biometry 510 or 511, or Industrial and Labor Relations 510 (p. 45).

NUTRITION. Three semester hours. One of the following courses is usually taken: Human Nutrition and Food 332 (p. 37), Animal Science 410 (p. 38) or Graduate School of Nutrition 620 (p. 35).

SEMINARS. One semester hour. One of the following seminar courses is usually chosen: Human Nutrition and Food 605, or Food Science 600.

SPECIAL PROBLEM. Six semester hours. Graduate School of Nutrition 710 (see p. 25 for details).

APPROVED COURSES IN FOOD SCIENCE. Eleven semester hours. Courses approved for this credit are listed below in the order found in the Description of Courses (p. 36):

		Semester Hours
Graduate School of Nutrition 580	International Nutrition Problems, Policy, and Programs	3
Biological Sciences 530	Biochemistry of the Vitamins	2
Food Science 413	Analytical Methods	4
Food Science 302	Dairy and Food Engineering	4
Food Science 401	Food from Fermentations	5
Food Science 404	Chemistry of Milk	2
Human Nutrition and Food 446	Science of Food	3 or 4
Human Nutrition and Food 447	Science of Food, Laboratory	1
Human Nutrition and Food 456	Experimental Food Methods	2
Human Nutrition and Food[a] 500	Special Problems for Graduate Students	
Human Nutrition and Food 516	Readings in Food	2
Poultry Science 450	Poultry Meat and Egg Technology	3
Pomology 201	Postharvest Physiology, Handling and Storage of Fruits	3
Vegetable Crops 412	Handling and Marketing Vegetables, Advanced Course	4
Graduate School of Nutrition 590	Food Economics	3

[a] Credit hours as arranged.

These are minimum course requirements for the M.F.S. degree and are normally supplemented with additional courses.

Special Research Problem—Report and Examination

The research involved in the special problem report which should be of thesis quality, is required for both degrees and may be directed by any joint faculty member of the student's choice who is willing to supervise it. However, members of the core staff serve as advisers most frequently. The research problem is normally assigned by the student's faculty adviser.

A written report of the special research problem and a final oral examination covering both research report and course work are required for either degree. The examination is arranged at a time suitable to the examining committee which is comprised of the student's adviser plus at least one other member of the faculty to be designated by the faculty of the Graduate School of Nutrition or its delegated agent. A legible copy of the report as approved by the student's adviser must be submitted to the examining committee at least one week prior to the final examination.

The final copy of the written report, including any changes recommended by the examining committee, must be submitted to the Office of the Dean of the Graduate School of Nutrition as soon as possible after the final examination. This report should be typed, double spaced, on 8½-by-11-inch paper. Either the original ribbon copy on Cornell bond paper, or a good quality Xerox copy, should be bound in black cloth and lettered both on the front and on the spine of the volume. An appropriate copy must be presented to the student's faculty adviser. Further directions concerning the form in which the report is to be submitted may be obtained from either the student's faculty adviser or the Office of the Dean of the Graduate School of Nutrition.

The written report of the special research problem and the final oral examination must be completed by the deadline set by the Graduate School in order to graduate the same term. Degrees are conferred in January, June, and September of each year.

Orientation Requirements

Prior to registration, all new M.N.S. candidates are requested to attend a two-day orientation program, September 8 and 9, 1970, which includes an introductory meeting, a tour of Savage Hall, and meetings with the core faculty professors.

During this orientation, each student will meet individually with an advisory committee of three core faculty professors who will help him formulate his academic program for the fall term according to his previous experience, future goals, and the required curriculum for graduation. These interviews last for about a half hour per student.

Also during the orientation program, each of the nine core faculty professors who direct students in the M.N.S. degree program will meet with the group of new students to discuss his specialization in nutrition

and to describe his current research programs. With the same purpose in mind, students are encouraged to arrange throughout the first term subsequent meetings with joint faculty members. These meetings will enable a student to choose a specialization and adviser by the beginning of the second term. The selected adviser will direct the student's research problem and assume the advisory committee's duties of formulating the student's curriculum for the M.N.S. degree.

Residence Requirements

Residence will vary with the candidate's background, training, and experience; but to receive a degree from the Graduate School of Nutrition, a student must complete at least two units of residence at the School after receiving a Bachelor's degree from Cornell or elsewhere. Full-time study for one semester with satisfactory accomplishment constitutes one residence unit. In most instances, the time required to obtain the degree exceeds the minimum requirements and generally takes two academic years plus the intervening summer.

SUMMER SESSION STUDY

A student registered in the Graduate School of Nutrition may receive credit for courses completed at the University during the summer if his program is approved in advance by his faculty adviser. To receive this credit he must also be registered in the University Summer Session.

The student may earn residence credit by registering for a minimum of four or a maximum of twelve weeks for summer research on his individual problem under the personal direction of a member of the faculty of the School. The student thus uses the summer period to meet, in whole or in part, the requirements of six semester hours for the Special Problem (Graduate School of Nutrition 710). (See p. 25.)

To receive credit for summer courses and/or research, students must complete official registration using forms provided by the Office of the Registrar and administered by the Office of the Summer Session. The rate of tuition is $65 per credit hour; the General Fee is $5 per week.

TUITION AND FEES

REGISTRATION FEE. A registration fee of $35 must be made by every applicant accepted for admission unless the candidate has previously matriculated as a student at Cornell University. A check or money order payable to Cornell University should be remitted to the Graduate School, Sage Graduate Center, upon notification of acceptance. This fee pays the matriculation fee, chest x-ray fee, and examination book charge, and covers certain expenses incurred at graduation if the student receives a degree. The fees will not be refunded to any candidate who withdraws his application after May

22, or after twenty days following his admission approval. This fee is *not* covered by University fellowships, scholarships or assistantships.

TUITION. The tuition for students registered in the Graduate School of Nutrition is $200 per term payable at the beginning of each term. Certain assistantships carry a waiver of tuition.

GENERAL FEE. A General Fee of $287.50 a term payable at the beginning of each term is required of each registrant of the Graduate School of Nutrition. The General Fee contributes toward the services supplied by the libraries, Gannett Clinic, Sage Infirmary, and the student union in Willard Straight Hall, and pays a portion of the extra cost of laboratory courses and general administration.

SUMMER SESSION FEE. All students of the Graduate School of Nutrition who attend classes or do research in the Summer Session must register both in the Graduate School and in the Summer Session to receive credit. Registration forms are provided by the Office of the Registrar and administered by the Office of the Summer Session. The rate of tuition is $65 per credit hour; the General Fee is $5 per week.

IN ABSENTIA. A graduate student registered *in absentia* must pay a fee of $35 each term.

LIMITED REFUNDS. Limited refunds of the General Fee and tuition will be made to students who withdraw from the University prior to completion of a term, for reasons accepted as satisfactory. Students who withdraw are charged tuition and the General Fee at a rate of 10 per cent for each week or fraction of a week from registration to the effective date of withdrawal. However, the refund will be made according to the number of instructional days elapsed if a student leaves for one of the following reasons: completion of degree requirements, military service, or on recommendation of University health services. A student arranges for withdrawal at the Graduate School Office. No charge is made if the student withdraws within six days of registration. No part of the Registration Fee is refundable.

The amount, time and manner of payment of tuition, fees or other charges may be changed by the Board of Trustees at any time without previous notice.

ASSISTANTSHIPS AND TRAINEESHIPS

A number of assistantships and traineeships are available in the School's research programs, and any student admitted to the School may apply in writing to the secretary, Graduate School of Nutrition, for this type of financial aid (no special application form is provided). The term of and stipend for each appointment are determined on an individual basis after the student has been accepted by the Graduate School. For September appointments, applications should be made by March 1, and announcement of appointments will be made on or about April 1.

Traineeships in Public Health

Students interested in preparing for positions as public health nutritionists may apply for public health traineeship awards from the United States Public Health Service. Applicants may secure application forms and additional information from any of the regional medical directors of the United States Public Health Service or from:

Chief
Health Manpower Grants Branch
Division of Health Manpower Educational Services
Bureau of Health Professions, Education and Manpower Training
Public Health Service
Department of Health, Education, and Welfare
Bethesda, Maryland 20014

ADVISORY SERVICE FOR CORNELL UNDERGRADUATES

An undergraduate in the College of Agriculture, Arts and Sciences, or Human Ecology who is interested in graduate work in nutrition may obtain guidance in planning his undergraduate curriculum from members of the faculty of the Graduate School of Nutrition. Courses are selected by the adviser to provide the undergraduate with the best background for continuing in a Master's degree program in his chosen area of specialization in nutrition. Only in this way can some students complete the M.N.S. or M.F.S. degree with the minimum residence requirement of two units of residence.

HEALTH SERVICES AND MEDICAL CARE

Health services and medical care for students are centered in two Cornell facilities: the Gannett Medical Clinic (out-patient department) and the Sage Infirmary. Students are entitled to unlimited visits at the Clinic (appointments with individual doctors at the Clinic may be made, if desired, by calling or coming in person; an acutely ill student will be seen promptly whether he has an appointment or not). Students are also entitled to laboratory and x-ray examinations indicated for diagnosis and treatment, hospitalization in the Sage Infirmary with medical care for a maximum of fourteen days each term, and emergency surgical care. The cost of these services is covered in the General Fee.

On a voluntary basis, insurance is available to supplement the services provided by the General Fee. For further details, including charges for special services, see the *Announcement of General Information*. If, in the opinion of the University authorities, the student's health makes it unwise for him to remain in the University, he may be required to withdraw.

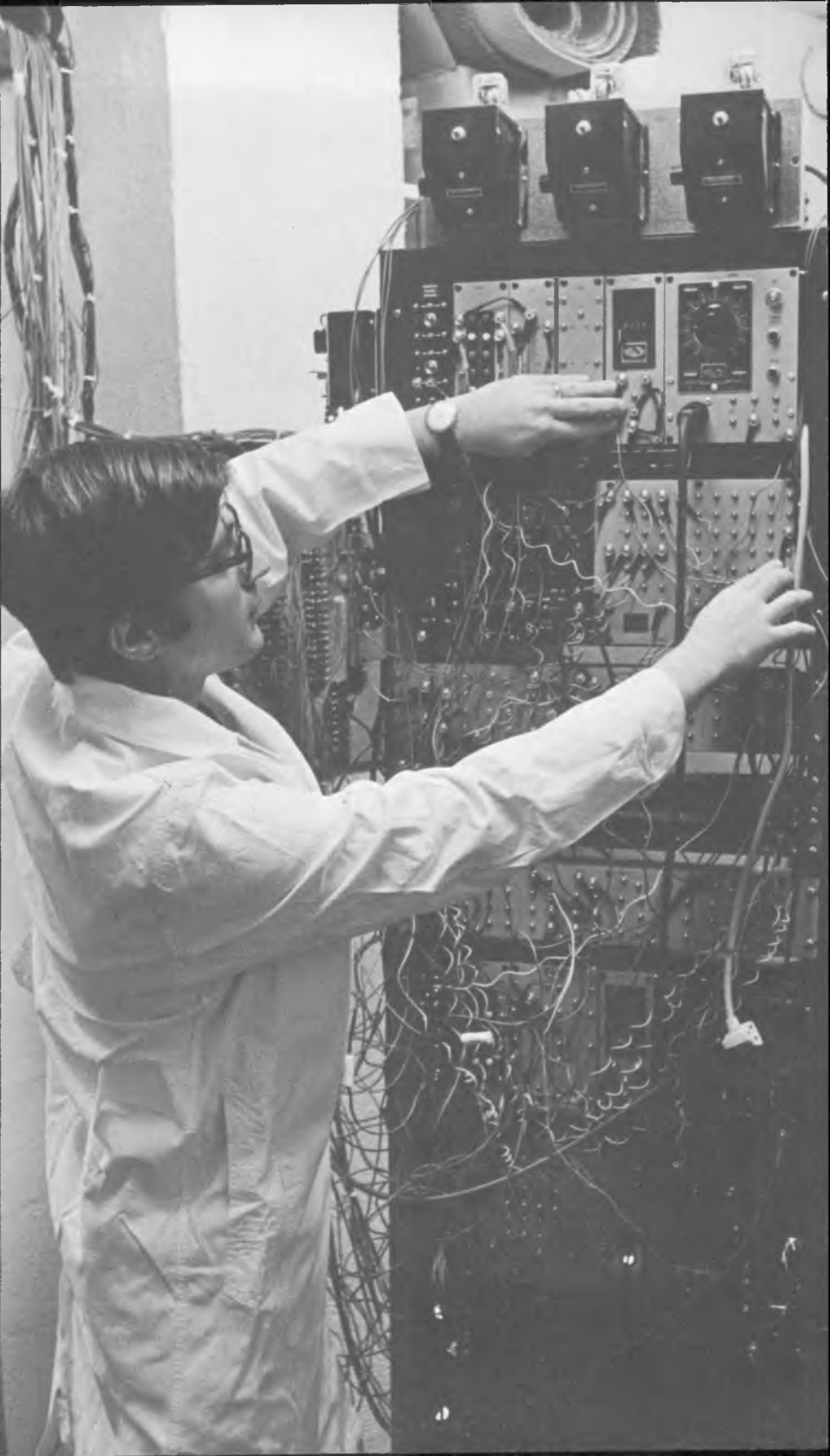
If a student prefers to consult a private physician rather than go to the Clinic, or to have the services of a private doctor while a patient in the Infirmary, he must bear the cost of these services.

GRADUATE HOUSING

DORMITORY ACCOMMODATIONS. The Sage Graduate Center provides dormitory housing for approximately 190 men and women. Situated in the center of the campus, it is convenient to all colleges. The Graduate Center is available for use by all graduate students and faculty and contains a cafeteria seating 200, study rooms, and lounges. In addition to the Sage Graduate Center, Cascadilla Hall accommodates approximately 155 graduate men and women. Applications for dormitory accommodations may be obtained any time after January 1 for the coming academic year by writing to the Department of Housing and Dining Services, 223 Day Hall.

FAMILY ACCOMMODATIONS. The University, through the Department of Housing and Dining Services, has three apartment developments for married students and their families. They are Cornell Quarters, Pleasant Grove Apartments, and Hasbrouck Apartments, with total housing for about 400 families. All apartments are unfurnished. For further information and application, write the Department of Housing and Dining Services, 223 Day Hall.

OFF-CAMPUS HOUSING. To assist students, both married and single, to secure adequate housing, the Department of Housing and Dining Services and the Office of the Dean of Students provide information. Information on housing *currently available* is posted for convenience in the Department of Housing and Dining Services, 223 Day Hall. Because changes in currently available apartments occur daily, it is not practical to prepare lists. If at all possible, a student should plan to visit Ithaca well in advance of residence to obtain suitable quarters.

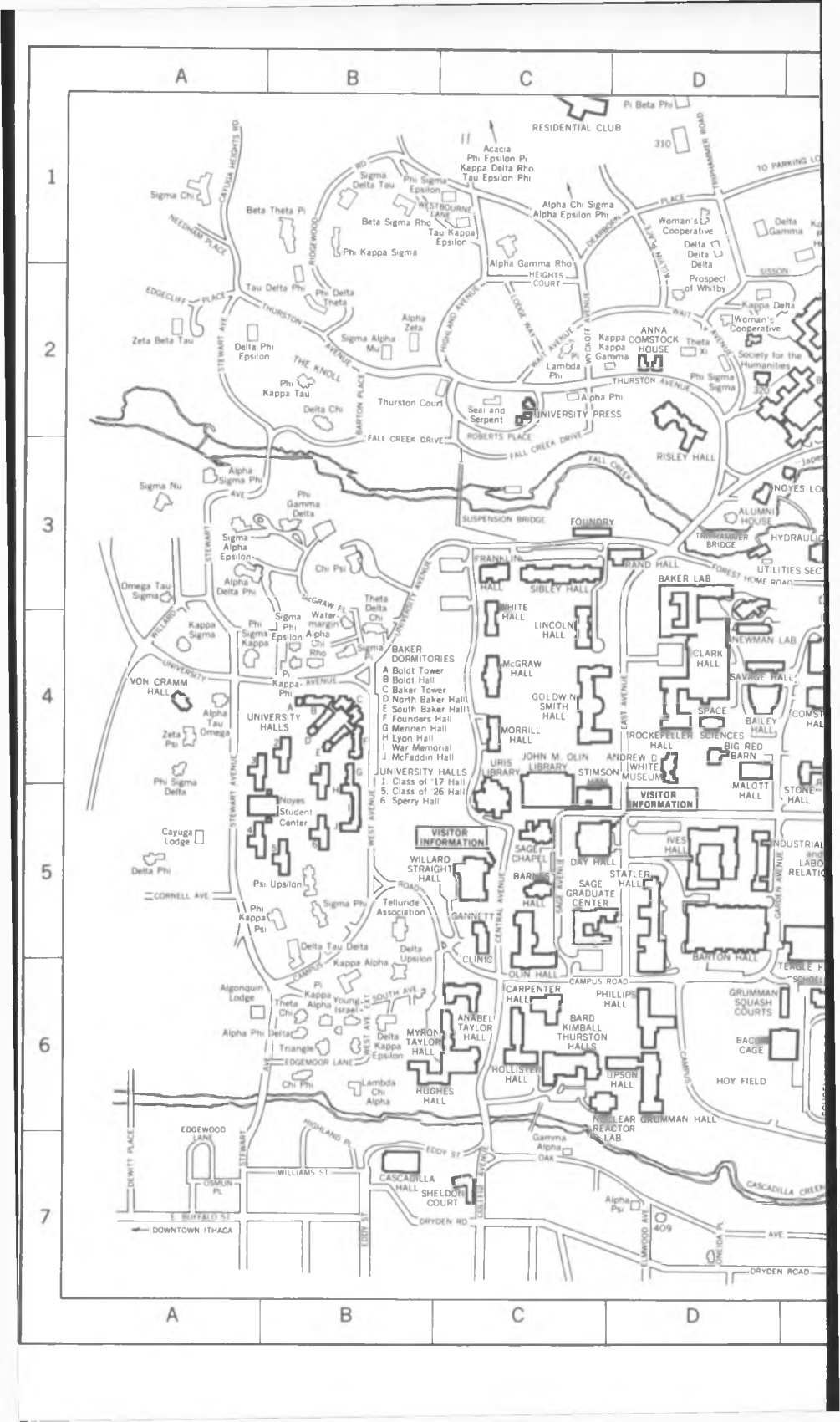


KEY TO THE CAMPUS MAP ON THE FOLLOWING PAGES

Africana Studies & Research Ctr. (320 Wait Ave.) D2
Agronomy Field Bldg. J4
Alumni Fields F5
Alumni House D3, offices, *Alumni News*
Announcements distribution (Research Park, Bldg. 7) H2
Artificial Breeders G7
Azalea (Rockwell) Garden D5
Bacon Cage E6, athletics
Bailey Hall D4, auditorium
Baker Lab. D3, chemistry
Bard Hall C6, materials science & engineering
Barnes Hall C5
Barton Hall D5, gymnasium, lost & found, military training, safety & security division
Beebe Lake EF3–4
Big Red Barn D4, alumni ctr.
Blauvelt Memorial Lab. GH5, entomology
Bradfield Hall F5, meteorology, microclimate investigations (U.S.D.A. Soil & Water Conservation Research), soil testing
Bruckner Lab. F4, poultry biology research
Building Care, Division of (100 Judd Falls Rd.) G4
Bus Garage (Rt. 366) J6
Caldwell Hall E4
Campus Store C5
Career, Summer Plans, & Placement Ctr. (14 East Ave.) D5
Carpenter Hall C6, engineering admin. & library
Chemistry Research Bldg. (wing of Baker Lab.) D3
Clark Hall D4, applied physics; cell physiology, growth, and development; engineering physics; materials science ctr.; physics; science, society, & technology
Collyer boat house, Cayuga Lake Inlet
Communication Arts mailing room (Research Park, Bldg. 7) H2
Comstock Hall E4, entomology & limnology
Construction, Dept. of (104 Maple Ave.) E7
Crescent E6, football stadium
Dairy Cafeteria (Stocking Hall) G5
Day Hall C5, University admin. & services
Dyce Honeybee Lab. (Freese Rd.) H2
Emerson Hall F4, agronomy, plant breeding & biometry, seed cooperatives
Fernow Hall F4, conservation, U.S. Government Bureau of Sport Fisheries and Wildlife
Filter Plant J4
Fishery Lab. H7
Food & Laundry Services (Maple Ave.) F7
Foundry C3, arch. studio
Franklin Hall C3, art, Asian studies
Gannett Medical Clinic C5
Gardens D5, E5, HJ5, J3
Golden Nematode Lab. & Greenhouse H5
Goldwin Smith Hall C4, arts & sciences admin., Classics, comparative lit., economics, English, freshman humanities, German lit., history of art, philosophy, Romance studies, Russian lit., Semitic languages & literatures, six-year Ph.D.
Golf course H2 *(see also* Moakley House)
Graphic Arts Services G6, addressograph & mailing, coordinator of mail, print shop
Greenhouses E5, H4
Grumman Hall D6, aero. engineering
Grumman Squash Cts. E6
Guterman Bioclimatic Labs. J5
High Voltage Lab. (909 Mitchell St.) H7
Hollister Hall C6, civil engineering, engineering basic studies, water resources & marine sciences
Housing, student *(see* Student residences)
Hoy Field D6, baseball
Humphreys Service Bldg. F7
Ind. & Labor Relations Conference Ctr. D5
Insectary GH5, entomology
Ives Hall D5, ind. & labor relations, summer session & extramural courses, University personnel office, statistics ctr.
"Japes" E3, recreation
Judging Pavilion G5
Kimball Hall C6, materials processing
Langmuir Lab., Research Park H2, neurobiology & behavior, computer services, ecology & systematics
Library Tower C5
Lincoln Hall C4, music, theatre arts
Lynah Hall E5, ice skating, hockey
Malott Hall D4, business & public admin., hospital admin.
Mann Library Bldg. F4, agriculture & human ecology library, Bailey Hortorium, finance & business (statutory colleges), Wiegand Herbarium
McGraw Hall C4, anthropology, archaeology, geological sciences, sociology
Minns Garden E5
Moakley House H2, golf, recreation
Morrill Hall C4, modern languages, psychology
Morrison Hall H5, animal science
Newman (Helen) Hall E2–3, women's phys. ed.
Newman Lab. D4, nuclear studies
Noyes Lodge D3, cafeteria
Noyes Student Ctr. AB5, cafeteria, student activities
Observatory (Fuertes) F3, astronomy
Olin Hall C5, applied mathematics ctr., chemical engineering, guidance & testing ctr., judicial administrator, reading-study ctr., unclassified students division
Olin Library (graduate & research) C4–5
Ornithology Lab. (Sapsucker Woods Rd.) H2

[*Continued on p. 34*]

Behavioral abnormalities resulting from malnutrition early in life are being studied by giving rats a variety of behavioral tests. To analyze this abnormal behavior quantitatively, electronic programming devices are employed to program an environmental event and record the reaction of the animal.


A
B
C
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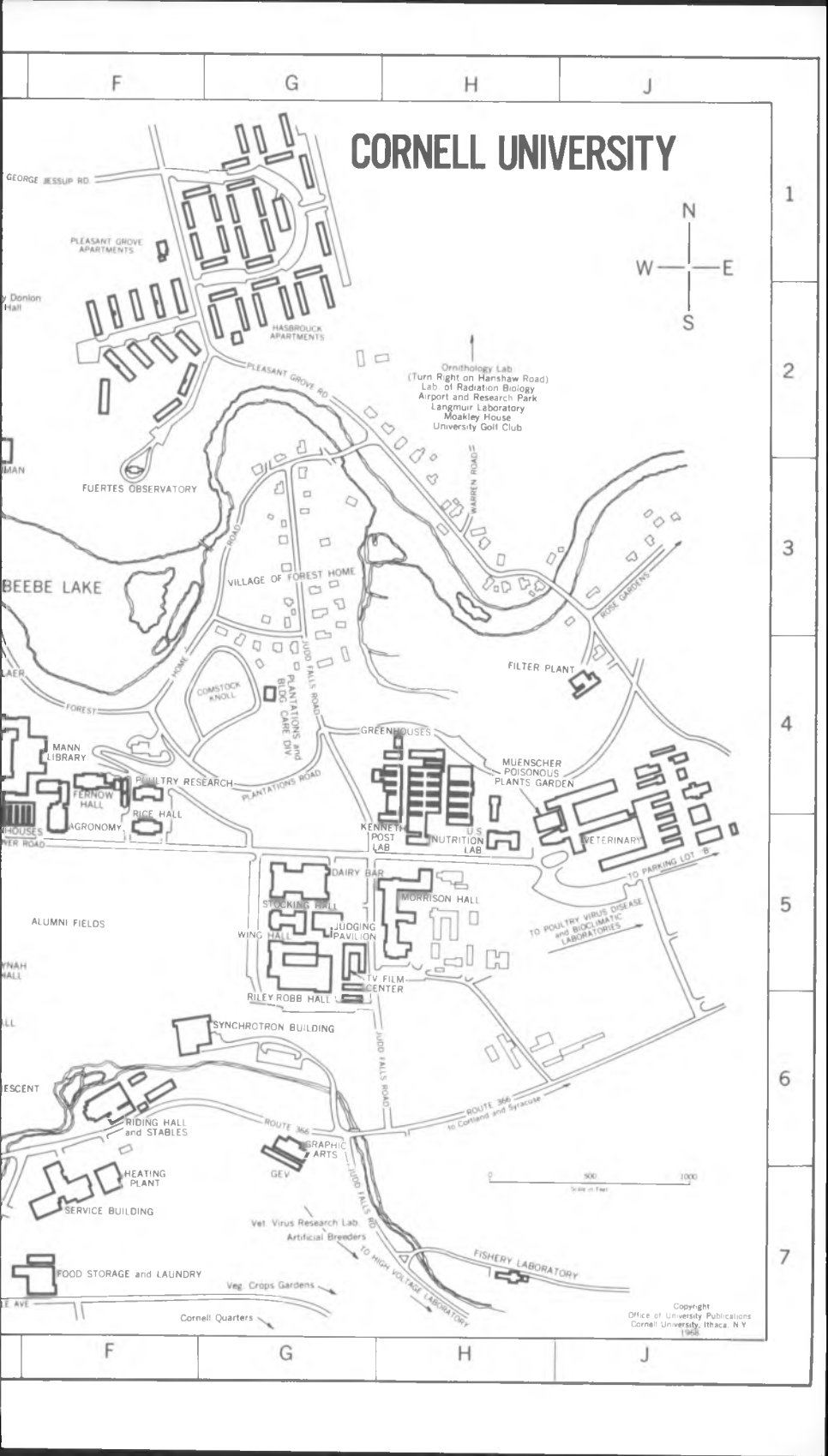
RESIDENTIAL CLUB
Pi Beta Phi
Acacia
Phi Epsilon Pi
Kappa Delta Rho
Tau Epsilon Phi
Sigma Chi
Sigma Delta Tau
Phi Sigma Epsilon
Beta Theta Pi
Beta Sigma Rho
Tau Kappa Epsilon
Phi Kappa Sigma
Alpha Chi Sigma
Alpha Epsilon Phi
Alpha Gamma Rho
Tau Delta Phi
Phi Delta Theta
Alpha Zeta
Sigma Alpha Mu
Zeta Beta Tau
Delta Phi Epsilon
Phi Kappa Tau
Delta Chi
Thurston Court
Seal and Serpent
UNIVERSITY PRESS
Alpha Phi
Lambda Phi
Kappa Kappa Gamma
ANNA COMSTOCK HOUSE
Theta Xi
Phi Sigma Sigma
Woman's Cooperative
Delta Gamma
Delta Delta Delta
Prospect of Whitby
Kappa Delta
Society for the Humanities
RISLEY HALL
FOUNDRY
SUSPENSION BRIDGE
ALUMNI HOUSE
HYDRAULIC
UTILITIES SECT
Alpha Sigma Phi
Sigma Nu
Phi Gamma Delta
Sigma Alpha Epsilon
Chi Psi
Omega Tau Sigma
Alpha Delta Phi
Kappa Sigma
Phi Sigma Kappa
Sigma Phi Epsilon
Theta Delta Chi
Water-margin
Alpha Chi Rho
Sigma Pi
Pi Kappa Phi
VON CRAMM HALL
UNIVERSITY HALLS
Alpha Tau Omega
Zeta Psi
Phi Sigma Delta
Noyes Student Center
Cayuga Lodge
Delta Phi
Psi Upsilon
Phi Kappa Psi
Sigma Phi
Delta Tau Delta
Kappa Alpha
Delta Upsilon
Algonquin Lodge
Pi Kappa Alpha
Young Israel
Theta Chi
Alpha Phi Delta
Delta Kappa Epsilon
Triangle
Chi Phi
Lambda Chi Alpha
MYRON TAYLOR HALL
ANABEL TAYLOR HALL
HUGHES HALL
BAKER DORMITORIES
A Boldt Tower
B Boldt Hall
C Baker Tower
D North Baker Hall
E South Baker Hall
F Founders Hall
G Mennen Hall
H Lyon Hall
I War Memorial
J McFaddin Hall
UNIVERSITY HALLS
1. Class of '17 Hall
5. Class of '26 Hall
6. Sperry Hall
FRANKLIN HALL
SIBLEY HALL
WHITE HALL
LINCOLN HALL
McGRAW HALL
GOLDWIN SMITH HALL
MORRILL HALL
URIS LIBRARY
JOHN M. OLIN LIBRARY
STIMSON HALL
ANDREW D. WHITE MUSEUM
VISITOR INFORMATION
WILLARD STRAIGHT HALL
Telluride Association
GANNETT CLINIC
SAGE CHAPEL
BARNES HALL
DAY HALL
STATLER HALL
SAGE GRADUATE CENTER
OLIN HALL
CARPENTER HALL
HOLLISTER HALL
BARD
KIMBALL
THURSTON HALLS
PHILLIPS HALL
UPSON HALL
NUCLEAR REACTOR LAB
GRUMMAN HALL
GRUMMAN SQUASH COURTS
BACON CAGE
HOY FIELD
BARTON HALL
CASCADILLA HALL
SHELDON COURT
Gamma Alpha
Alpha Psi
BAKER LAB
CLARK HALL
NEWMAN LAB
SAVAGE HALL
BAILEY HALL
SPACE
ROCKEFELLER HALL
SCIENCES
BIG RED BARN
MALOTT HALL
STONE
IVES HALL
INDUSTRIAL AND LABOR RELATIONS
TEAGLE HALL
SCHOOL
TRIPHAMMER BRIDGE
FORAST HOME ROAD
NOYES LODGE
TO PARKING LOT
DEARBORN PLACE
WESTBOURNE LANE
HEIGHTS COURT
LODGE WAY
WYCKOFF AVENUE
HIGHLAND AVENUE
RIDGEWOOD
NEEDHAM PLACE
EDGECLIFF PLACE
THURSTON AVENUE
THE KNOLL
BARTON PLACE
ROBERTS PLACE
FALL CREEK DRIVE
FALL CREEK
STEWART AVE
STEWART
WILLARD WAY
UNIVERSITY AVENUE
McGRAW PL
WEST AVENUE
CENTRAL AVENUE
EAST AVENUE
SAGE AVENUE
GARDEN AVENUE
CAMPUS ROAD
CAMPUS
CORNELL AVE
SOUTH AVE
WEST AVE
EDGEMOOR LANE
HIGHLAND PL
EDDY ST
WILLIAMS ST
OSMUN PL
E. BUFFALO ST
DOWNTOWN ITHACA
DEWITT PLACE
EDGEWOOD LANE
DRYDEN RD
DRYDEN ROAD
CASCADILLA CREEK
LINWOOD AVE
DANBY RD
409
320
310


CORNELL UNIVERSITY
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GEORGE JESSUP RD.
PLEASANT GROVE APARTMENTS
Donlon Hall
HASBROUCK APARTMENTS
PLEASANT GROVE RD.
Ornithology Lab.
(Turn Right on Hanshaw Road)
Lab. of Radiation Biology
Airport and Research Park
Langmuir Laboratory
Moakley House
University Golf Club
WARREN ROAD
FUERTES OBSERVATORY
BEEBE LAKE
VILLAGE OF FOREST HOME
ROSE GARDENS
FILTER PLANT
COMSTOCK KNOLL
PLANTATIONS and BLDG. CARE DIV.
JUDD FALLS ROAD
MANN LIBRARY
FERNOW HALL
POULTRY RESEARCH
PLANTATIONS ROAD
RICE HALL
AGRONOMY
GREENHOUSES
MUENSCHER POISONOUS PLANTS GARDEN
KENNETH POST LAB
U.S. NUTRITION LAB
VETERINARY
TO PARKING LOT B
DAIRY BAR
MORRISON HALL
STOCKING HALL
WING HALL
JUDGING PAVILION
TO POULTRY VIRUS DISEASE and BIOCLIMATIC LABORATORIES
ALUMNI FIELDS
TV FILM CENTER
RILEY ROBB HALL
SYNCHROTRON BUILDING
ROUTE 366 to Cortland and Syracuse
RIDING HALL and STABLES
ROUTE 366
GRAPHIC ARTS
GEV
HEATING PLANT
SERVICE BUILDING
Vet. Virus Research Lab.
Artificial Breeders
TO HIGH VOLTAGE LABORATORY
FISHERY LABORATORY
FOOD STORAGE and LAUNDRY
Veg. Crops Gardens
Cornell Quarters
0
500
1000
Scale in Feet
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Office of University Publications
Cornell University, Ithaca, N.Y.
1968

[*Key to map, continued*]

Parking lots: lot A, E1; lot B, J5; Kite Hill lot EF6
Pesticide Lab. H5
Phillips Hall D6, elec. engineering
Plant Breeding Field Bldg. J4
Plant Science building E4, genetics, development, & physiology; floriculture & ornamental horticulture; plant pathology; pomology; vegetable crops
Plantations office (100 Judd Falls Rd.) G4
Poisonous Plants (Muenscher) Garden HJ5
Post Lab. H4–5, floriculture
Poultry Virus Disease Lab. J5
Professional Skills Roster (104 Maple Ave.) E7
Radiation Biology Lab. (Warren Rd.) H2
Rand Hall D3, international studies ctr., research in education ctr., office of teacher preparation
Research Park (Brown Rd.) H2
Rice Hall F5, poultry science
Riding Hall & Stables (Rt. 366) F6
Riley-Robb Hall G5, agric. engineering, farm electrification council
Roberts Hall E4, agric. admin., biol. sciences admin., communication arts, state college fleet, U.S. post office substation
Rockefeller Hall D4
Rose Gardens J3
Sage Chapel C5
Sage Graduate Ctr. C5, graduate school admin.
Sage Infirmary (Sage Place; entrance from E. Seneca St.) A7
Savage Hall D4, nutrition
Schoellkopf Field & Hall E6, athletics
Schoellkopf (Paul) House E6, director of phys. ed. & athletics; visiting teams
Sheldon Ct. C7, Research Park office, University Press order dept.; University Publications
Sibley Hall C3, arch., art, & planning; government; history; housing & environmental studies ctr.
Society for the Humanities (300 Wait Ave.) D2
Space Sciences Bldg. D4, astronomy, radiophysics & space research
Statler Hall D5, hotel admin.
Statler Inn (north wing of Statler Hall) D5, faculty club, hotel
Stimson Hall C5
Stocking Hall G5, cafeteria, food science, microbiology
Stone Hall E4, Dept. of Education
Student residences:
Algonquin Lodge A6; Baker Halls (North and South) B4; Baker Tower B4; Balch Halls E2; Boldt Hall & Tower B4; Cascadilla Hall B7; Cayuga Lodge A5; Class of '17 Hall B4–5; Class of '26 Hall B5; Comstock (Anna) Hall D2; Cornell Quarters FG7; Dickson Hall E2; Donlon Hall E2; Founders Hall B4; Hasbrouck Apts. G1–2; Hughes Law Residence Center B6; Lyon Hall B5; McFaddin Hall B5; Mennen Hall B4; North Campus Student Residences EF1–2; Phillips House E1; Pleasant Grove Apts. F1–2; Prospect of Whitby D2; Residential Club D1; Risley Hall D2; Sage Graduate Ctr. C5; Sperry Hall B5; Telluride Assoc. B5; Thurston Ct. BC2; Triphammer Cooperative D1; University Halls (2, 3, and 4) B4–5; von Cramm Scholarship Hall A4; Wait Ave. Cooperative D2; War Memorial B5; Wari Cooperative D1; Watermargin B4; Young Israel B6
Suspension Bridge C3
Taylor (Anabel) Hall C6, interfaith ctr.
Taylor (Myron) Hall C6, law
Teagle Hall E5, athletics, men's phys. ed.
Television Film Ctr., G5
Thurston Hall C6, theoretical & applied mechanics
Toboggan Lodge E3, industrial & fire safety offices
Triphammer Bridge & Falls, DE3
Typewriter & Instrument Repair Division, (110 Maple Ave.) E7
University Press C2
Upson Hall D6, computer science, ind. engineering & operations research, mechanical engineering, plasma studies lab.
Uris Library (undergraduate) C4–5
U.S. Plant, Soil, & Nutrition Lab. H5
Van Rensselaer Hall E4, human ecology
Veterinary College J4–5
Veterinary Virus Research Lab. G7
Visitor Information Ctrs. (Day Hall, Willard Straight Hall) C5
Ward Lab. of Nuclear Engineering CD6, nuclear science & engineering
Warren Hall E4, agric. econ., biometrics unit, rural sociology
Weinhold Chilled Water Plant E3
WHCU-AM-FM (212 E. State St.) A7
White Hall C4, mathematics
White Museum of Art D4
Willard Straight Hall C5, dining, student activities
Wilson Synchrotron FG6
Wing Hall G5, biochemistry & molecular biology

DESCRIPTION OF COURSES

The following list of courses includes both those specified previously as required for the degrees offered and some of those from which the student may select electives, with the approval of his faculty adviser, in accordance with his specific field of interest.

The information in parentheses following the name of the course refers to the department or the division in which the course is given, and the course number. In registering for any course, list the course number and the department or division, rather than the name of the course. The times and rooms for courses are not always available at printing. To obtain course times and rooms the student should consult the specific departmental office, the individual *Announcements* issued by the colleges concerned, or the Cornell University Course and Room Roster available at registration. Information in brackets indicates that the course is not given in 1970–71.

The courses are grouped as follows:

NUTRITION: General
Human Nutrition
Animal Nutrition

BIOCHEMISTRY, CHEMISTRY, AND PHYSICS

PHYSIOLOGY AND PHYSICAL BIOLOGY

MATHEMATICS, STATISTICS, AND RESEARCH DESIGN

FOOD SCIENCE AND MICROBIOLOGY

SOCIAL SCIENCES: Economics and Food Marketing
Sociology and Anthropology
Education and Public Health

SEMINARS: Nutrition
Biochemistry
Other Seminars

NUTRITION

In this area some courses are more oriented toward human nutrition and others are more oriented toward animal nutrition. Although courses based on experimental animal nutrition are often fundamental to a knowledge of human nutrition, a clear-cut distinction is not implied in the following course groupings.

GENERAL

GENERAL NUTRITION
(Graduate School of Nutrition 620)

Fall. Credit three hours. Prerequisite, permission of the instructor. Lectures, M W F 11:15. Savage 130. Professor Lutwak and staff.

This course is offered to students whose principal academic training has been in a field other than nutrition. It is designed to meet their need for a basic but intensive introduction to the principles, history, and applications of nutrition.

SPECIAL TOPICS IN NUTRITION
(Graduate School of Nutrition 660)

Throughout the year. Maximum of three credit hours per term. Registration by permission. Graduate School of Nutrition faculty.

Designed for a student who wishes to become well-informed in any specific topic he selects which is related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a group of students, and/or selected lectures of a course already offered. Topics can be changed so that the course may be repeated for credit.

SPECIAL PROBLEM
(Graduate School of Nutrition 710)

Throughout the year. Six credit hours. Report of individual problem under the direction of any member of the faculty of the Graduate School of Nutrition (See p. 25 for details).

ADVANCED NUTRITION SERIES

A series of nutrition courses offered jointly by the Department of Human Nutrition and Food, College of Human Ecology; the Departments of Animal Science and of Poultry Science, College of Agriculture; and the Graduate School of Nutrition. Prerequisites, courses in nutrition, physiology, and biochemistry to include intermediary metabolism; or permission of the instructor.

The biochemical and physiological bases of digestion, absorption, transport and metabolism of nutrients; species differences where applicable; and historical as well as current concepts in nutrition.

PROTEINS AND AMINO ACIDS
(Human Nutrition and Food 501)

Fall. Credit two hours. Lectures, W F 10:10. Van Rensselaer NG-6. Professor Morrison.

LIPIDS AND CARBOHYDRATES
(Poultry Science 502)

Fall. Credit two hours. Lectures, T Th 11:15. Rice 300. Associate Professor Bensadoun.

NUTRITIONAL ENERGETICS
(Animal Science 503)

Spring. Credit two hours. Lectures, M W 10:10. Morrison 342. Professor Reid.

VITAMINS AND ESSENTIAL INORGANIC ELEMENTS
(Poultry Science 504)

Spring. Credit two hours. Lectures, T Th 11:15. Rice 201. Professor Scott.

PATHOLOGY OF NUTRITIONAL DISEASES
(Veterinary Pathology 931)

Spring. Credit three hours. Prerequisites, Veterinary Pathology 630 and 631. Lecture and laboratory hours to be arranged. Designed primarily for graduate students of nutrition. Professor Krook.

HUMAN NUTRITION

INTERNATIONAL NUTRITION PROBLEMS, POLICY, AND PROGRAMS
(Graduate School of Nutrition 580)

Fall. Credit three hours. Registration by permission. Lectures, T Th 11:15–12:45. Savage 130. Professor Latham.

A review of food and nutrition problems, policy and programs especially as they relate to developing countries. Emphasis is placed on the need to coordinate the efforts of various government ministries or departments including those of agriculture, education, economics, health and community development. Among topics discussed are planning and evaluation of applied nutrition programs; education and training in nutrition; the importance of social and cultural factors; methods of increasing the use of protein-rich foods; assessment of nutritional status; the role of FAO, WHO, UNICEF and other agencies; action in case of famine; the integration of nutrition with other projects of disease control in developing countries.

CLINICAL AND PUBLIC HEALTH NUTRITION
(Graduate School of Nutrition 650)

Spring. Credit three hours. Prerequisites, a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For graduate students only. Lectures to be arranged. Professor C. M. Young and Assistant Professor Roe.

Designed to familiarize the student with some of the applications of nutrition to clinical and public health problems.

MATERNAL AND CHILD NUTRITION
(Human Nutrition and Food 222)

Fall and spring. Credit three hours. Prerequisite, Human Nutrition and Food 115A. Human nutrition and food majors electing this course must do so before taking Human Nutrition and Food 332. Lectures and discussion, M W F 1:25. Van Rensselaer NG-6. Associate Professor Newman.

Family nutrition with special emphasis upon the nutritional needs of the mother and child. Relation of nutrition to physical growth.

PRINCIPLES OF HUMAN NUTRITION
(Human Nutrition and Food 332)

Spring. Credit three hours. Prerequisites, Human Nutrition and Food 115A and a college course in biochemistry and in physiology. Lecture-discussion, T Th 9:05–10:30. Van Rensselaer 339. Associate Professor Newman.

Principles of nutrition as they relate to energy metabolism, proteins, fats, minerals, and vitamins. Use of professional literature to acquaint the student with considerations involved in the application of nutrition information to human nutrition problems, to illustrate methods used in studying nutrition, and to provide experience in interpretation of scientific reports.

NUTRITION AND DISEASE
(Human Nutrition and Food 441)

Spring. Credit three hours. Prerequisite, Human Nutrition and Food 332 or equivalent. Discussion, M W F 9:05. Van Rensselaer NG-31. Associate Professor Rivers.

Study of the physiological and biochemical anomalies in certain diseases and the principles underlying nutritional therapy. Independent survey of the technical literature in this field.

COMMUNITY NUTRITION AND HEALTH
(Human Nutrition and Food 445)

Fall. Credit three hours. Prerequisite, Human Nutrition and Food 246 and 332 or permission of the instructor. Lecture, W F 1:25. Laboratory or field work, M 1:25–4:25. Associate Professor Rivers.

Study of biological and environmental dimensions of human nutritional problems in contemporary society; and application of basic concepts of food and nutrition to the improvement of man's health, evaluation of federal, state, and community programs focused on improving man's nutrition. Laboratory work includes (a) developing materials for field studies and evaluation, and (b) projects and field trips in nearby communities. Field experiences will be selected and developed to expose students to food and nutrition problems of man over his entire life span from infancy to old age.

NUTRITION AND GROWTH
(Human Nutrition and Food 512)

Fall. Credit two hours. Prerequisite, Human Nutrition and Food 332 or permission of instructor. Signature of instructor required for undergraduate students. Lectures, W F 9:05. Van Rensselaer NG-5. Associate Professor Newman.

Aspects of human physical and chemical growth of particular interest to nutritionists. Survey of methodology; comparison of individual growth patterns of selected body dimensions with group patterns; consideration of some of the variables, including diet, which influence growth.

READINGS IN NUTRITION
(Human Nutrition and Food 514)

Spring. Credit three hours. Prerequisite, Human Nutrition and Food 332 or equivalent. Lectures, T Th 11:15 and an additional hour to be arranged. Assistant Professor Snook.

Critical review of literature on selected topics in the field of nutrition. Emphasis on human nutrition. Topics are changed each term so the course may be repeated for credit with permission of the instructor.

RESEARCH METHODS IN HUMAN METABOLIC STUDIES
(Human Nutrition and Food 524)

Spring. Credit three hours. Prerequisites, Human Nutrition and Food 332 or equivalent, laboratory experience in biochemistry or quantitative analysis, and permission of the instructor. Lecture and laboratory, T Th 2–4:25. Van Rensselaer 353. Associate Professor Schwartz and faculty.

Principles of human metabolic research; experimental design of human studies; dietary considerations; methods of collecting and analyzing biological material; and evaluation. Laboratory will include planning and management of a metabolic study, collection and the appropriate analysis of blood, urine, and feces.

ANIMAL NUTRITION

PRINCIPLES OF ANIMAL NUTRITION
(Animal Science 410)

Fall. Credit three or four hours. Prerequisites, a course in human or veterinary physiology and a course in organic chemistry or biochemistry or permission of instructor. Lectures, M W F 10:10. Laboratory, optional, hours to be arranged. Morrison 342. Professor Loosli, Associate Professor Nesheim, and Assistant Professor Hintz.

The chemistry and physiology of nutrition and the comparative nutritive requirements of maintenance, growth, reproduction, egg production, and lactation.

SPECIAL TOPICS IN ANIMAL NUTRITION
(Animal Science 510)

Fall. Credit one hour. Registration by permission. Lectures, to be arranged. Morrison 342. Professor S. E. Smith and staff.

A discussion of selected advanced topics in animal nutrition.

LABORATORY WORK IN ANIMAL NUTRITION
(Animal Science 511)

Fall. Credit three hours. Prerequisites, quantitative analysis and Animal Science 410 or its equivalent, or permission of the instructor. Lectures, M W F 2–4:25. Morrison 342 and 443. Professor Warner.

Each student engages in a series of short research projects with experimental animals, such as rats, rabbits, and sheep. Both classical and modern techniques of animal experimentation are considered. The applications of biochemical methods to the solution of animal nutrition problems are stressed.

BIOCHEMISTRY, CHEMISTRY, AND PHYSICS

PRINCIPLES OF BIOCHEMISTRY, LECTURES
(Biological Sciences 431)

Fall and spring. Credit four hours per term. Prerequisite, Organic Chemistry 353–355 or the equivalent. Fall term lectures, M 8, Morrison 146; T Th S 8, Ives 120. Professor Daniel. Spring term lectures, M W F 10:10 and discussion period to be arranged. Assistant Professor Edelstein.

A basic course dealing with the chemistry of biological substances and their transformations in living organisms.

PRINCIPLES OF BIOCHEMISTRY, LABORATORY
(Biological Sciences 432)

Spring. Credit three hours. Prerequisite, quantitative analysis or permission of the instructor. Biological Sciences 431 or 532 may be taken concurrently. Laboratory section A, M W 2–4:25. Wing 106. Discussion period, M 1:25. Riley-Robb 105. Laboratory section B, T Th 2–4:25. Wing 106. Discussion period T 1:25. Section B is designed primarily for students who have had previous biochemical laboratory experience. Preliminary examinations will be held. Associate Professor Neal: section A, and Assistant Professor Fessenden-Raden: section B.

Laboratory practice with biochemical substances and experiments designed to illustrate basic biochemical principles and techniques.

[BIOCHEMISTRY OF THE VITAMINS]
(Biological Sciences 530)

Spring. Credit two hours. Prerequisites, Chemistry 353–355 and Biological Sciences 431 or their equivalents. Lectures, T Th 10:10. Savage 100. Professor Daniel. Offered in alternate years. Not offered in 1971.

The chemical and biochemical aspects of the vitamins.

INTERMEDIATE BIOCHEMISTRY, LECTURES
(Biological Sciences 531–532)

Fall and spring. Credit four hours per term. Prerequisites, Chemistry 358, Biological Sciences 431, or consent of the instructor. Physical Chemistry desirable. Lectures, M W F S 9:05. Riley-Robb 125.

The major areas of biochemistry will be covered in some detail. This

course is appropriate for students who have previously had a one-semester introductory biochemistry course. Fall semester: proteins, enzymes and the nature of enzymatic catalysis; carbohydrate metabolism; nitrogen metabolism. Assistant Professor Calvo and staff. Spring semester: energetics; lipid metabolism; biosynthesis of informational macromolecules. Associate Professor Guillory and staff.

INTERMEDIATE BIOCHEMISTRY, LABORATORY
(Biological Sciences 533)

Fall. Credit three hours. Prerequisites, Chemistry 358 and Chemistry 288 or 390. Must be taken with or following Biological Sciences 531. Laboratory, T or Th 9:05–4:25. Wing 107. One discussion period to be arranged. Professor Nelson and Assistant Professors McCarty and Wharton.

The first meeting for both sections will be held on the first Tuesday of the fall term at 9:05. Selected experiments on carbohydrates, proteins, amino acids, and metabolism (cellular particulates, kinetics, general enzymology) will be given to illustrate basic biochemical principles. The course will emphasize the quantitative aspects rather than qualitative identification.

ADVANCED BIOCHEMISTRY SERIES

Throughout the year. Lectures and seminars on specialized topics. Credit one hour per topic. Prerequisite, Biological Sciences 532 or consent of the instructor. May be repeated for credit. In the lecture courses a term paper is generally required.

LIPIDS AND MEMBRANES
(Biological Sciences 633)

Fall. First four and one-half weeks of term. Lectures, T Th 9:05. Savage 100. Professor Zilversmit.

ENZYMES AND COENZYMES
(Biological Sciences 635)

Fall. Middle four and one-half weeks of term. Lectures, T Th 9:05. Savage 100. First meeting Thursday, October 15. Professor McCormick.

MECHANISM OF ENZYME ACTION
(Biological Sciences 637)

Fall. Last four and one-half weeks of term. Seminar, T Th 9:05. Savage 100. First meeting Tuesday, November 17. Professor Gibson.

NUCLEIC ACIDS
(Biological Sciences 634)

Spring. First four and one-half weeks of term. Lectures, T Th 9:05. Savage 100. Professor Heppel.

PROTEIN SYNTHESIS
(Biological Sciences 636)

Spring. Middle four and one-half weeks of term. Lectures, T Th 9:05. Savage 100. First meeting Thursday, March 4. Assistant Professor Wilson.

STRUCTURE AND FUNCTION OF PROTEINS
(Biological Sciences 638)

Spring. Last four and one-half weeks of term. Seminar, T Th 9:05. Savage 100. First meeting Tuesday, April 6. Professor Hess.

BIOCHEMISTRY OF GASTROINTESTINAL FERMENTATION
(Animal Science 505)

Fall. Credit two hours. Prerequisites, quantitative analysis, Animal Science 410 and Biological Sciences 431, or permission of the instructor. Lectures, to be arranged. Morrison 342 and 301. Associate Professor Van Soest.

Gastrointestinal fermentations in relation to utilization of cellulosic materials as food. Chemical composition of plants and factors affecting their nutritive value.

INTRODUCTORY QUANTITATIVE ANALYSIS
(Chemistry 236)

Fall and spring. Credit four hours. Prerequisite, Chemistry 108 or advanced placement in chemistry. Enrollment is limited. Lectures, T Th 12:20. Laboratory: fall term, M W or T Th 1:25–4:25; spring term, M W or T Th 1:25–4:25, or F 1:25–4:25 and S 8–11, if warranted by sufficient registration. Preliminary examinations may be given in the evening. Professor Morrison and assistants.

A study of the fundamental principles of quantitative chemistry. Laboratory experiments are designed to illustrate basic principles and practice of quantitative procedures.

INTRODUCTORY PHYSICAL CHEMISTRY
(Chemistry 287–288)

Throughout the year. Credit three hours a term. Prerequisites, Chemistry 108 or 116 and Mathematics 111–112 or consent of the instructor. Chemistry 287 is prerequisite to 288. Lectures, W F 9:05. Occasional lectures and examinations, M 9:05. Recitation, M W or F 1:25. Fall term, Professor Albrecht. Spring term, Assistant Professor Fisk and assistants.

A systematic treatment of the fundamental principles of physical chemistry.

INTRODUCTORY ORGANIC CHEMISTRY
(Chemistry 357–358)

Throughout the year. Credit three hours a term. Prerequisite, Chemistry 108 or 116, or advanced placement in chemistry. Chemistry 357 is prerequisite to Chemistry 358. Parallel registration in Chemistry 355–356 is recommended. Lectures, M W F 9:05. Scheduled preliminary examinations may be held in the evening. Professor Meinwald.

A systematic study of the more important classes of carbon compounds, reactions of their functional groups, methods of synthesis, relations, and uses.

GENERAL PHYSICS
(Physics 101–102)

Throughout the year. Credit four hours a term. Prerequisite, three years of college preparatory mathematics. Physics 101 (or 207) is prerequisite to 102. Similar to but less analytically demanding then Physics 207–208. Students who plan to major in a physical or biological science should preferably elect Physics 207–208. (See also Physics 201–202.) Demonstration lectures, M W 9:05 or 11:15. Two discussion hours per week and a two-hour laboratory period, on alternate weeks, as assigned. Two preliminary examinations will be held per term. Professor Greisen, Assistant Professor Delvaille, Associate Professor Sievers, Mr. McBreen, and staff.

Basic principles of physics, treated quantitatively but without calculus. Topics include motion, dynamics, conservation laws, kinetic theory, gravitational and electromagnetic forces and fields, wave motion and light, relativity, atomic physics, structure of matter, and nuclear physics. Historical

and philosophical allusions as time permits. At the level of *Fundamental Physics* (Second Edition) by Orear, and *Theory of Physics,* (1967) by Stevenson and Moore.

ANALYTICAL METHODS
(Food Science 413)

Spring. Credit four hours. Prerequisites, Food Science 210, one term of either organic chemistry or biochemistry. Lectures, T Th 11:15. Stocking 119. Laboratory, Th 1:25–4:55. Stocking 209. Assistant Professor Sherbon. Offered in alternate years. Offered in 1971.

A study of the analytical methods important to the food industry. The emphasis is on understanding the basic analytical chemistry applied in the various tests. General topics include sampling, gravimetric and volumetric methods, optical methods, electrochemistry, and the use of basic statistics.

[INSTRUMENTAL METHODS]
(Food Science 512)

Spring. Credit five hours. Prerequisite, Food Science 413 or permission of the instructor. Lectures, M W F 11:15. Stocking 120. Laboratory, M or T 1:25–4:55. Stocking 209. Assistant Professor Sherbon. Given in alternate years. Not offered in 1971.

Deals with instrumental methods widely used in research and industry. The major emphasis is on chromatography, spectroscopy, electrophoresis, ultracentrifugation, thermal analysis, and the use of computers. The stress will be on the practical use of the material presented.

PHYSIOLOGY AND PHYSICAL BIOLOGY

HISTOLOGY: THE BIOLOGY OF THE TISSUES
(Biological Sciences 313)

Fall. Credit four hours. Prerequisites, a two-semester introductory biology sequence; comparative anatomy and organic chemistry or biochemistry desirable. Lectures, T Th 11:15. Stimson G-1. Laboratory, T Th 8–9:55 or 2:30–4:25. Stimson 206. Professor Wimsatt.

A general course dealing with the biology of the tissues to provide the student with a basis for understanding the microscopic and fine structural organization of vertebrates and the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, chemical composition, and function in cells and tissues are stressed.

SPECIAL HISTOLOGY: THE BIOLOGY OF THE ORGANS
(Biological Sciences 412)

Spring. Credit four hours. Prerequisites, Biological Sciences 313, or consent of instructor. Enrollment limited to eighteen students. Lectures, W F 9:05. Stimson 105. Laboratory, W F 2–4:25. Stimson 206. Staff. Given in alternate years. Offered in 1970.

A continuation of Biological Sciences 313. The microscopic and ultrastructural organization of the principal vertebrate organ systems are studied in relation to their development, functional interaction, and special physiological roles. Biological Sciences 313 and 412 together present the fundamental aspects of the microscopic and submicroscopic organization of the vertebrate body from a physiological perspective. The organization of the course involves student participation in "lecture-seminars" and the prosecution of independent

project work supplementary to the regular work of the laboratory. The latter enables students to gain practical experience with histological and histochemical preparative techniques.

GENERAL ANIMAL PHYSIOLOGY, LECTURES
(Biological Sciences 410)

Spring. Credit three hours. Prerequisites, one year of biology and courses in chemistry, organic chemistry, physics, and biochemistry desirable. Lectures, M W F 10:10. Stimson G-25. Assistant Professor Howland.

The principles of animal physiology are developed through consideration of the functioning of cells, tissues and organs. Specific topics discussed include respiration, metabolism, circulation, excretion, chemical integration, muscle contraction, nerve action, and sensory reception.

GENERAL ANIMAL PHYSIOLOGY, LABORATORY
(Biological Sciences 410A)

Spring. Credit one hour. Prerequisites, Biological Sciences 413 or equivalent must be taken concurrently. Lecture W 2, alternate weeks only. Stimson G-25. Laboratory, T 8–11 or M T Th or F 1:25–4:25, alternate weeks. Stimson 306. Assistant Professor Howland.

Students are introduced to basic techniques utilized in the study of the physiology of animal tissues. Experiments cover topics dealing with respiration, properties of muscle, circulation, activity of nerves, and osmotic phenomena.

MAMMALIAN PHYSIOLOGY
(Biological Sciences 414)

Spring. Credit six hours. Registration by permission. Prerequisite, a year of biological sciences. Courses in biochemistry, histology, and gross anatomy desirable. Lectures, M W F 8. Morrison 167. Discussion, S 10:10. Morrison 167. Laboratory, M or W 1:25. Morrison 174. Professors Gasteiger, Hansel, and Visek (in charge), and Associate Professor Bensadoun.

A general course in mammalian physiology including circulation, respiration, digestion, metabolism, renal function, endocrinology, and the nervous system.

EXPERIMENTAL ENDOCRINOLOGY
(Biological Sciences 513)

Fall. Credit two or three hours. Primarily for graduate students, open to undergraduates for two credits. Prerequisites, a year of zoology or its equivalent, organic chemistry, physiology, and consent of instructor. Lectures, M F 11:15. Stimson G-1. Laboratory, M or F 2–4:25. Stimson 306. Professor Leonard.

Lectures on the anatomy and physiology of the vertebrate endocrine glands, glandular interrelationships, mechanisms of hormone action, chemical and physiological properties of the hormones, assay methods. Laboratory includes small animal surgery, microtechnique, illustrative experiments on the effects of hormones.

FUNDAMENTALS OF ENDOCRINOLOGY
(Animal Science 427)

Fall. Credit four hours. Prerequisite, a course in human or veterinary physiology, or by permission. Lectures, T Th S 10:10. Morrison 167. Laboratory to be arranged. Professor Hansel.

A general course in the physiology of the endocrine glands, and the roles played by each hormone in the regulation of normal body processes. The laboratory work consists of a series of projects designed to illustrate the basic principles of endocrinology and their applications to more efficient production in all classes of livestock.

PHYSIOLOGY
(Veterinary Physiology 917)

Spring. Credit three hours. Prerequisites, Veterinary Physiology 510, Veterinary Anatomy 501 and 502, or Veterinary Anatomy 900 or Biological Sciences 311 and 433. Lectures, T Th F 8. Professors Bergman, Sellers, Stevens; Associate Professors Dobson and Nangeroni.

Lectures and demonstrations on cellular physiology, muscle, nervous system, digestive system, urine secretion, blood, and lymph.

PHYSIOLOGY
(Veterinary Physiology 918)

Fall. Credit three hours. Prerequisite, Veterinary Physiology 511. Lectures, T Th F 8. Professors Bergman and Sellers.

Lectures and demonstrations on circulation, respiration, endocrine organs, temperature regulation, and reproduction.

RADIOISOTOPES IN BIOLOGICAL RESEARCH: PRINCIPLES AND PRACTICE
(Veterinary Physical Biology 921)

Spring. Credit four hours. Lectures, T Th 11:05. Laboratory, M T or W 1:30–5. Prerequisites, a course in quantitative chemistry and permission of instructor. Professor Lengemann and staff.

Lectures, demonstrations, and laboratory on the fundamentals of atomic energy procedures and applications to biological research.

BIOLOGICAL EFFECTS OF RADIATION
(Veterinary Physical Biology 922)

Fall. Credit two hours. Lectures, T Th 10:10. Laboratory, Th 1:30–4:25. Assistant Professor Casarett.

Lectures and demonstration on radiation physics, radiation chemistry, radiation effects at the cellular level, radiation effects in multicellular organisms, genetic effects of radiation, and radioprotective and radiomimetic substances.

[BIOLOGICAL MEMBRANES AND NUTRIENT TRANSFER]
(Veterinary Physical Biology 923)

Spring. Credit two hours. Prerequisites, animal or plant physiology, quantitative and organic chemistry, physics, and consent of instructor. Cellular physiology and elementary physical chemistry desirable. Time and place to be arranged. Professor Wasserman. Offered in alternate years. Not offered in 1971.

An introduction to elementary biophysical properties of biological membranes, theoretical aspects or permeability and transport, and mechanism of transfer of inorganic and organic substances across intestine, placenta, kidney, erythrocytes, bacteria, and other biological systems.

MATHEMATICS, STATISTICS, AND RESEARCH DESIGN

CALCULUS
(Mathematics 111)

Either term. Credit three hours. Prerequisite, three years of high school mathematics, including trigonometry. Lectures, fall term: M W 11:15, 12:20, plus one hour to be arranged. Lectures, spring term: M W F 8, 9:05, 10:10; T Th S 8, 11:15, 12:20.

Plane analytical geometry, differentiation and integration of algebraic and trigonometric functions, applications.

CALCULUS
(Mathematics 112)

Either term. Credit three hours. Prerequisite, Mathematics 111. Lectures, fall term: M W F 9:05, 10:10; T Th S 9:05, 10:10. Lectures, spring term: M W 11:15, 12:20, plus one hour to be arranged.

Differentiation and integration of elementary transcendental functions, the technique of integration, conic sections, polar coordinates, infinite series.

DESIGN OF SURVEY SAMPLES
(Economic and Social Statistics 310)

Spring. Credit three hours. Prerequisite, one term of statistics.

Application of statistical methods to the sampling of human populations. A thorough treatment of the concepts and problems of sample design with respect to cost, procedures of estimation, and measurement of sampling error. Analysis of nonsampling errors and their effects on survey results (e.g., interviewer bias and response error). Illustrative materials will be drawn from the fields of market research, attitude and opinion research, and the like.

COMPUTER TECHNIQUES FOR STATISTICS AND BIOLOGY
(Statistics and Biometry 407)

Fall. Credit two hours. Prerequisite or corequisite, an introductory course in statistics. Lecture, M 11:15. Bradfield 101. Laboratory, M 2. Warren 160. Associate Professor Searle.

Introduction to uses of computers in statistics: calculation of elementary statistical analyses, techniques of sampling and simulation, and availability of library programs. CUPL, the Cornell University Programming Language, will be taught and used for problem solving; use may also be made of some library programs.

STATISTICAL METHODS I
(Statistics and Biometry 510)

Fall. Credit four hours. Prerequisite, graduate standing or permission of instructor. Lectures, T Th S 10:10. Plant Science 233. Laboratory to be arranged. Examinations will be held at 7:30 P.M. on Thursday evenings. Assistant Professor Urquhart.

The distributions of statistics encountered in biological fields and others are considered from the point of view of elementary probability notions and by sampling from known population. The results, with principles of experimentation, are applied to the conduct of experiments and interpretation of results. Topics include point and interval estimation, tests of hypotheses and of significance, the treatment of discrete data, methods involving rank sum procedures, the consideration of normal populations, the one-way analysis of variance and simple linear regression. Emphasis is placed on basic sta-

tistical principles, criteria for selection of statistical techniques and the application of these techniques to a wide variety of biological situations.

STATISTICAL METHODS II
(Statistics and Biometry 511)

Spring. Credit four hours. Prerequisite, Statistics and Biometry 510 or the equivalent. Lectures, T Th S 10:10. Warren 231. Laboratory to be arranged. Examinations will be held at 7:30 P.M. on Thursday evenings. Assistant Professor Urquhart.

The work of Statistics and Biometry 510 is continued. Topics include multiple and curvilinear regression, complex analyses of variance and covariance. The analysis of variance discussion considers treatment designs, single degree of freedom contrasts, the simpler experimental designs, sampling errors, fixed, mixed, and random models, and the effect of disproportionate numbers. When appropriate, the computer is considered as the reasonable way to have calculations done.

ECONOMIC AND SOCIAL STATISTICS
(Industrial and Labor Relations 510)

Fall and spring. Credit three hours. Professor McCarthy.

A nonmathematical course for graduate students in the social studies without previous training in statistical method. Emphasis will be placed on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered will include analysis of frequency distributions, regression and correlation analysis, and selected topics from the area of statistical interference.

INTRODUCTION TO COMPUTER USE
(Developmental Sociology 540)

Fall and spring. Credit two hours. Prerequisite, one course in statistics. Lectures, T Th 11:15. Plant Science 141. Assistant Professor Eberts.

An introductory course in the computer system at Cornell for the student who wishes to use the computer in his research but who does not necessarily want to become a programmer.

The course is divided into two parts. The first part is designed to give the student a working knowledge of the elementary aspects of Fortran IV so that he will be able to do preliminary transformations of his data and simple Fortran programs.

The second part deals with the various "canned" programs which are most often used by social scientists. The student is introduced to program packages such as Michigan, Bimed, and SSP. Instruction will be given on running the programs as well as discussing the differences between them.

RESEARCH DESIGN AND ANALYSIS IN THE SOCIAL SCIENCES
(Consumer Economics and Public Policy 501)

Spring. Credit three hours. Prerequisites, introductory statistics and permission of the instructor. Lectures, W 2:30–4:25. Laboratory to be arranged.

The course is a general introduction to the design and analysis of research. The emphasis will be on survey research methods for social and economic studies. A two-hour weekly laboratory session will be held in which data from a research project in progress will be analyzed to provide experience in applying the concepts and techniques developed in lecture sessions.

RESEARCH DESIGN
(Developmental Sociology 515)

Fall. Credit three hours. Open to graduate students only. Warren 131. Lectures, T Th 1:25–2:55.

An introduction to the methods of social research. Course topics follow the major steps in the design and execution of sociological research from the definition of the problem and formulation of hypotheses to the interpretation of results and preparation of a final report. Practice exercises are assigned each week utilizing data from departmental projects.

CROSS-CULTURAL RESEARCH METHODS
(Developmental Sociology 516)

Spring. Credit three hours. Prerequisite, Developmental Sociology 515 or permission of the instructor. Lectures, W F 1:25–2:40. Warren 131. Associate Professor Young.

The comparative study of large social systems is presented as a new research style that is especially appropriate to research in and on developing countries. The field technique of macrosurveys is considered in detail, but the uses of available data such as national social accounting, documents, ethnographic reports, and aerial photographs are emphasized. Special attention is given to trend studies, the assumptions of macrostructural analysis, rapid, low-cost research procedures, and the mechanics of data archives.

FOOD SCIENCE AND MICROBIOLOGY

DAIRY AND FOOD ENGINEERING
(Food Science 302)

Fall. Credit four hours. Prerequisites, Physics 101 and 102 or the equivalent and Food Science 100. Lectures, M W F 10:10. Laboratory, M 2–4:25. Stocking 119. Professor Jordan. Offered in alternate years. Offered in 1970.

[FOOD FROM FERMENTATIONS]
(Food Science 401)

Fall. Credit five hours. Prerequisite, beginning courses in microbiology and organic chemistry or biochemistry are recommended. Lectures and laboratories, T Th 11:15–4:25. Professor Kosikowski and Assistant Professor Ledford. Given in alternate years. Not offered in 1970.

[INTERNATIONAL FOOD DEVELOPMENT]
(Food Science 403)

Fall. Credit three hours. Lectures, M W 2–4:25. Professor Kosikowski. Given in alternate years. Not offered in 1970.

A study of programs, technical problems, and progress associated with developing acceptable food supplies in critical world areas. Proposals for increasing world protein resources for the human are to be discussed. Special attention is to be directed to the organization, operations, relationships, and contributions of United Nations, technical agencies, FAO, UNICEF, WHO, and governmental and nongovernmental organizations in the field.

CHEMISTRY OF MILK
(Food Science 404)

Fall. Credit three hours. Prerequisites, qualitative and quantitative analysis and organic chemistry. Stocking 120. Assistant Professor Ledford. Offered in alternate years. Offered in 1970.

[FOOD PROTEINS]
(Food Science 501)

Fall. Credit two hours. Lectures, W F 8. Stocking Hall. Assistant Professor Sherbon. Given in alternate years. Not offered in 1970.

The first part of the course will deal with the general properties of proteins; structure, preparation, and reactions. The second part will deal with proteins as part of food systems, occurrence and composition, associations and structures, and reactions to processing. Assigned readings, writing, and exercises will be used to insure the students obtain a working knowledge of current research in the area.

[FOOD CARBOHYDRATES]
(Food Science 502)

Spring. Credit two hours. Prerequisites, Biological Sciences 431 or the equivalent. Assistant Professor Hood. Given in alternate years. Not offered in 1971.

A consideration of the chemistry of carbohydrates in foods including sugars, starches, pectins, gums, and cellulose. Emphasis will be placed on their origin in raw materials and the subsequent changes occurring during processing and storage.

FOOD LIPIDS
(Food Science 503)

Fall. Credit two hours. Open to graduate students. Lectures, W F 12:20. Stocking 119. Assistant Professor Kinsella. Given in even-numbered years. Offered in 1970.

This course covers the disposition of lipid materials in foods and the manner in which lipids influence the chemical and physical attributes of various foods. The effects of production techniques, storage, heating, refrigeration and enzymes on food lipids are described, and the chemical mechanisms involved are elucidated. The importance of lipids in the formation of food flavors is discussed.

SCIENCE OF FOOD
(Human Nutrition and Food 446)

Fall. Credit three hours (lectures only) or four hours (with laboratory). Prerequisites, Human Nutrition and Food 246 or equivalent. Students who have had limited laboratory experience in comparative foods should register for four hours. Lectures, T Th S 9:05. Van Rensselaer NG-35. Laboratory, for students registered for four credit hours, T 2–4:25. Van Rensselaer 358. Professor Hester, Assistant Professor Pichel, and Associate Professor Armbruster.

Scientific principles underlying modern food theory and practice. The relation to food quality of (a) the physical and chemical properties of proteins, lipids, carbohydrates, leavening agents and pigments; (b) stability of colloidal systems; (c) chemical composition and physical structure of natural and processed foods. Laboratory experiments designed to illustrate the effect of varying ingredients and treatments on the quality characteristics of food products.

SCIENCE OF FOOD, LABORATORY
(Human Nutrition and Food 447)

Fall. Credit one hour. Prerequisite or parallel, Human Nutrition and Food 446. Laboratory, Th 1:25–4:25. Associate Professor Armbruster.

Laboratory experiments designed to illustrate (a) the physiochemical be-

havior of colloidal systems; (b) chemical reactions of some food components; (c) effects of temperature, pH, moisture, inorganic salts and enzymes on physiochemical changes in natural foods, food components, and food mixtures.

EXPERIMENTAL FOOD METHODS
(Human Nutrition and Food 456)

Spring. Credit three hours. Prerequisite, Human Nutrition and Food 446. A course in statistics and Human Nutrition and Food 447 are desirable but not required. Laboratory, M W 1:25–4:25. Van Rensselaer 358. Associate Professor Armbruster.

SPECIAL PROBLEMS FOR GRADUATE STUDENTS
(Human Nutrition and Food 500)

Fall and spring. Credit to be arranged. Department faculty.

READINGS IN FOOD
(Human Nutrition and Food 516)

Fall. Credit two hours. Prerequisite, Human Nutrition and Food 446 or equivalent. Time and place to be arranged. Assistant Professor Pichel.

POULTRY MEAT AND EGG TECHNOLOGY
(Poultry Science 450)

Spring. Credit three hours. Prerequisite, Chemistry 355 or its equivalent, and Biological Sciences 290. Lectures, T Th 9:05. Laboratory to be arranged. Rice 101. Professor Baker. Given in alternate years. Offered in 1971.

POSTHARVEST PHYSIOLOGY, HANDLING, AND STORAGE OF FRUITS
(Pomology 201)

Fall. Credit three hours. Prerequisite, Pomology 101 or 102. Lectures, T Th 8. Plant Science 143B. Laboratory, F 2–4:25. Plant Science 114. Professor Smock.

VEGETABLE CROPS PHYSIOLOGY
(Vegetable Crops 401)

Fall. Credit four hours. Prerequisites, Vegetable Crops 211 and Biological Sciences 240 or their equivalent. Lectures, M W F 11:15. Plant Science 143. Laboratory, M 2–4:25. Discussion period to be arranged. Professor Kelly.

HANDLING AND MARKETING VEGETABLES, ADVANCED COURSE
(Vegetable Crops 412)

Fall. Credit four hours. Lectures, T Th 11:15. East Roberts 222. Laboratory, T or W 2–4:25. East Roberts 223. One-hour conference to be arranged. Professor Hartman.

GENERAL MICROBIOLOGY
(Biological Sciences 290)

Fall or spring. Credit five hours. Prerequisites, Biological Sciences 101–102 or 103–104 and Chemistry 104 or 108 or the equivalent. Lectures, M W F 11:15. Stocking 218. Laboratory, M W 2–4:25; T Th 8–11 or 2–4:25. Stocking 301 (except spring term, M W section in Stocking 321). Fall term, Professor H. W. Seeley. Spring term, Professor VanDemark.

A study of the basic principles and relationships in the field of microbiology, with fundamentals necessary to further work in the subject. The course offering in the spring term will provide special emphasis on the application of microbiology to home economics and agriculture.

GENERAL MICROBIOLOGY, LECTURES
(Biological Sciences 290A)
Fall or spring. Credit three hours. Prerequisites, Biological Sciences 101–102 or 103–104 and Chemistry 104 or 108 or the equivalent. Lectures, M W F 11:15. Stocking 218. Fall term, Professor H. W. Seeley. Spring term, Professor VanDemark.

The same as the lecture part of Biological Sciences 290. Will not serve alone as a prerequisite for advanced microbiology courses.

GENERAL MICROBIOLOGY, LABORATORY
(Biological Sciences 290B)
Fall or spring. Credit two hours. May be taken only by special permission of the instructor. Fall term, Professor H. W. Seeley. Spring term, Professor VanDemark.

The same as the laboratory part of Biological Sciences 290.

ADVANCED BACTERIOLOGY, LECTURES
(Biological Sciences 390A)
Fall. Credit three hours. Prerequisites, organic chemistry and Biological Sciences 290 or permission of the instructor, and biochemistry. Biochemistry may be taken concurrently. Lectures, T Th S 9:05. Stocking 119. Associate Professor MacDonald.

A study of the comparative physiological and ecological relationships among bacteria and some related organisms. A number of groups of bacteria will be discussed in detail as well as factors which influence their ability to survive in nature. In addition, a number of lectures will be devoted to the history of bacteriology and to the theory and development of bacterial classification.

ADVANCED BACTERIOLOGY, LABORATORY
(Biological Sciences 390B)
Fall. Credit three hours. Prerequisites, concurrent registration in 390A and permission of the instructor. Limited enrollment. Preference given to those students planning to register for Biological Sciences 490B. Laboratory-lecture, M 1:25. Discussion, F 9:05. Stocking 321. Associate Professor MacDonald.

Techniques for the isolation, cultivation, and detailed study of selected groups of organisms. Some of the more standard techniques of physiological study will be introduced.

DAIRY AND FOOD MICROBIOLOGY
(Biological Sciences 394)
Spring. Credit four hours. Prerequisite, Biological Sciences 290. Lectures, M W 12:20. Stocking 119. Laboratory, M W 2–4:25. Stocking 301. Professor Naylor.

The major families of microorganisms of importance in dairy and food science are studied systematically with emphasis on the role played by these organisms in food preservation, food fermentation, and public health. The laboratory work includes practice in the use of general and special methods for microbiological testing and control of dairy and food products, as well as practice in the isolation and characterization of organisms found in foods.

SOCIAL SCIENCES

ECONOMICS AND FOOD MARKETING

FOOD ECONOMICS
(Graduate School of Nutrition 590)

Spring. Credit three hours. Lectures, M W F 11:15. Savage 130. Professor Call.

Designed for students who are interested in any aspect of the food industry. Emphasis is placed on the economics of food production, processing, marketing, and consumption. Attention is given to both United States and international food problems in a systematic treatment of economic principles applicable to the food sector of any economy.

MARKETING
(Agricultural Economics 240)

Fall or spring. Credit three hours. Lectures, M W F 11:15. One discussion period only, during the first week of the term, M T W Th or F 2:30–4:25 or S 9:05–11. Warren 45. Professor Darrah.

A study of how food products are marketed. Special attention is given to the consumption of food products, factors that affect consumption, market channels, operation of different marketing agencies, storage, transportation, packaging, product identification, advertising and promotion, buying, selling, and costs.

AGRICULTURAL POLICY
(Agricultural Economics 351)

Fall. Credit three hours. Two lectures plus one discussion section each week. Lectures, T Th 9:05. Warren 45. Discussion sections, Th 11:15 or 2:30, or F 10:10. Warren 260. Professor Robinson.

A review of the history of public policies affecting agriculture in the United States and an analysis of the economic effects of alternative farm policies or programs, either proposed or adopted. Among the topics discussed are farm price support and surplus disposal programs, trade policies affecting agriculture and farm politics.

FOOD DISTRIBUTION
(Agricultural Economics 441)

Fall. Credit four hours. Prerequisites, Agricultural Economics 240 and 327. Open to juniors, seniors, and graduate students. Lectures, M W F 10:10 and F 2–4:25. Warren 245. Professor Earle.

A study of the structure and the competitive nature of the food industry. Particular attention is given to an analysis of the gross margin, expenses, earnings, and performance of food retailers. Government regulations with regard to mergers and buying and selling activities are examined. Leading food industry authorities frequently join the discussion session on Friday afternoons.

ECONOMICS OF AGRICULTURAL DEVELOPMENT
(Agricultural Economics 464)

Spring. Credit three hours. Prerequisite, Agricultural Economics 150, Economics 101–102, or consent of the instructor. Lectures, T Th S 9:05. Warren 345. Professor Mellor.

A discussion of the special problems of agricultural development in low per-capita income areas and countries. Attention will be devoted to the

relationship between development in agriculture and in other sectors of the economy, capital and capital formation, the role of land and land reform, increasing efficiency in resource use, coordination problems in agricultural development, and the like.

FOOD MERCHANDISING
(Agricultural Economics 541)

Fall. Credit two hours. Open only to graduate students. Lecture, Th 2:30–4:25. Warren 145. Professor Brunk.

A seminar course exploring alternative merchandising and promotional devices for food industry retailers and manufacturers. Special attention is given to identification and measurement of basic forces affecting consumer buying behavior.

[ECONOMIC ASPECTS OF THE WORLD'S FOOD]
(Agricultural Economics 560)

Fall. Credit three hours. Prerequisites, basic economics and a course in economic development. Time to be arranged. Primarily for graduate students, but open to seniors with permission of the instructor. Associate Professor Poleman. Given in alternate years. Not offered in 1970.

Designed for students in economics and agricultural economics who are interested in the problems associated with quantification of the "Malthusian dilemma." Briefly considered are human food requirements, the major food groups, and the geography of world food production and consumption. Also examined are national diets and historical trends in food consumption. Prime attention is devoted to techniques for data evaluation, including food balance sheets and consumption surveys, and the interrelations between population, food, and economic progress.

SEMINAR ON THE AGRICULTURAL DEVELOPMENT OF SOUTH ASIA
(Agricultural Economics 664)

Spring. Credit two hours. Open only to graduate students who have completed Agricultural Economics 364 or its equivalent. Times to be arranged. Professor Mellor.

SEMINAR ON LATIN AMERICAN AGRICULTURAL POLICY
(Agricultural Economics 665)

Fall. Credit three hours. Prerequisite, basic economics. Knowledge of Spanish or Portuguese is desirable. T 2:30–4:25, plus a weekly meeting with the instructor. Warren 145. Associate Professor Freebairn.

SEMINAR ON THE ECONOMICS OF TROPICAL AGRICULTURE
(Agricultural Economics 667)

Fall. Credit three hours. Prerequisites, basic economics and a course in economic development. Primarily for graduate students, but open to seniors with permission of the instructor. F 2:30–4, plus an individual weekly meeting with the instructor. Warren 31. Associate Professor Poleman. Given in even numbered years. Offered in 1970.

SEMINAR IN THE ECONOMICS OF AGRICULTURAL DEVELOPMENT
(Agricultural Economics 668)

Fall. Credit two hours. Open only to graduate students with permission. Time to be arranged. Professors Barraclough, Call, Conklin, and Mellor, Associate Professors Freebairn, Poleman, Sisler, and other staff.

INTERNATIONAL ECONOMIC THEORY AND POLICY
(Economics 561–562)

Throughout the year. Credit four hours a term. Lectures, M W F 11:15. Assistant Professor Levin.

ECONOMIC PROBLEMS OF LATIN AMERICA
(Economics 565)

Spring. Credit four hours. Hours to be arranged. Professor Davis.

SOCIOLOGY AND ANTHROPOLOGY

COMMUNITY AND REGIONAL DEVELOPMENT AND PLANNED CHANGE
(Developmental Sociology 411)

Spring. Credit three hours. Lectures, T Th 11:15–12:30. Warren 232. Professor Capener and others.

Various strategies of development and planned change will be explored. Reviewed also will be programs, organizations, agencies, and institutions operating in communities and regions that address themselves to various development strategies. Two major emphases are stressed: (1) the structural-functional roles and processes of organizations, agencies, and institutions as they implement programs of change and development in communities and regions, (2) roles of professionals and change agents representing and making operational development units.

APPLICATIONS OF SOCIOLOGY TO DEVELOPMENT PROGRAMS
(Developmental Sociology 528)

Spring. Credit four hours. Open to graduate students only. Lectures, M W F 11:15–12:30. Warren 31. Professor Polson.

Application of sociological theory and methods to the problems of institutions and agencies concerned with rural development. Special emphasis is placed on programs for agricultural extension education and community development in low income countries.

SOCIAL ANTHROPOLOGY
(Anthropology 301)

Fall. Credit four hours. Open to juniors and seniors who have not had Anthropology 101. Lectures, M W F 11:15. Professor Sharp.

A study and comparison of the types of learned, shared, and transmitted behavior patterns and ideas by means of which men of various periods and places have dealt with their environment, worked out their social relations with their fellow men, and defined their place in the cosmos. An inquiry into human nature and its expression in man's institutional and intellectual creations.

CULTURAL CHANGE
(Anthropology 313)

Fall. Credit four hours.

A study of various theories of cultural change and their relevance to the on-going social process; an analysis of such concepts as innovation, diffusion, and acculturation in relation to culture change theory; a consideration of factors involved in maintaining stability or stimulating change in nonindustrialized culture.

APPLIED ANTHROPOLOGY
(Anthropology 314)

Spring. Credit four hours. Professor Sharp.

The uses of anthropology in the modern world. Designed not only for students of the humanities and social sciences, but also for natural scientists concerned with the cultural problems involved in technological change, community development, native administration, and modernization in various regions of the world.

ETHNOLOGY OF SOUTH AMERICA
(Anthropology 432)

Spring. Credit four hours. Lectures, T Th S 9:05. Associate Professor Cancian.

ETHNOLOGY OF ISLAND SOUTHEAST ASIA
(Anthropology 434)

Spring. Credit four hours. Lectures, M W F 11:15. Professor Sharp.

ETHNOLOGY OF OCEANIA
(Anthropology 436)

Spring. Credit four hours. Lectures, M W F 2:30. Professor Turner.

CULTURE AND SOCIETY IN SOUTH ASIA
(Anthropology 441)

Fall. Credit four hours.

INTRODUCTION TO DEMOGRAPHY
(Sociology 530)

Spring. Credit four hours. Prerequisite, consent of the instructor. Lectures, M W F 10:10. Assistant Professor Marden.

A survey of the methods, theories, and problems of contemporary demography. Special attention is directed to the social determinants and consequences of fertility, mortality, and migration. The populations of both developed and developing areas are examined.

DEMOGRAPHIC THEORY
(Sociology 531)

Fall. Credit four hours. Lecture, T 1:25–3:20.

Deals with theory construction, hypothesis derivation, and the integration of theory and research in demography. Although emphasis is placed on contemporary theories, earlier formulations beginning with Malthus also are examined insofar as they deal with fertility, mortality, migration, and the people-resource question.

TECHNIQUES OF DEMOGRAPHIC ANALYSIS
(Sociology 535)

Fall. Credit four hours. Prerequisite, Sociology 230 or consent of the instructor. Lectures, T Th S 11:15.

SOCIAL ORGANIZATION AND CHANGE
(Sociology 541)

Fall. Credit four hours. Lectures, T Th 1:25–3:20.

MAN IN CONTEMPORARY SOCIETY
(Interdepartmental course 350, Human Ecology)

Fall and spring. Credit four hours. Lecture, M 7–10 P.M. Dean Knapp.

An interdisciplinary approach to problems of man in and interacting with his physical, biological and social environments. Analyses of the interaction of the physical, biological, and social dimensions of selected problems of man; implications of these interactions for individuals and families in society.

PERSPECTIVES ON POVERTY
(Interdepartmental course 372, Human Ecology)

Fall. Credit four hours. Lecture, W 2–4:25. Professor Feldman.

Conflicting viewpoints will be presented about the extent, nature, causes, and remedies of economic poverty. Faculty will be drawn from several disciplines both within and outside the College. A number of experiences with the poor will be offered, including a short term, live-in exchange, a continuing field experience during the term, and a film series.

RESEARCH PRACTICUM ON THE FAMILY IN POVERTY
(Interdepartmental course 376, Human Ecology)

Spring. Credit three hours. Prerequisites, Human Development and Family Studies 372 or Interdepartmental course 372, Human Ecology. Lectures to be arranged.

The interview method will be examined as a research tool with particular relevance to low income families. Students will take part in an on-going project by attending staff meetings, gathering and analyzing data.

SPECIAL TOPICS ON POVERTY
(Human Development and Family Studies 377)

Spring. Credit three hours. Prerequisites, Human Development and Family Studies 372 or permission of instructor. Lecture, T 2–4:25.

POLITICAL ECONOMY OF SOCIAL POLICY
(Consumer Economics and Public Policy 450)

Fall. Credit three hours. Lectures, T Th 1:25–2:40.

EDUCATION AND PUBLIC HEALTH

DESIGNING PROGRAMS OF DEVELOPMENTAL CHANGE
(Education 524)

Fall. Credit three hours. For graduate students interested in the principles and procedures basic to the development and execution of extension, adult, and community development and other programs of continuing education. Lecture, M 10:10. Lecture-discussion, T 1:25–3:20. Warren 132. Professor Leagans.

COMMUNICATING TECHNOLOGY
(Education 525)

Spring. Credit three hours. For graduate students interested in a comprehensive understanding of theory, principles, procedures and techniques related to the communication of technology as applied in adult, extension and community development programs. Lecture, M 10:10. Lecture-discussion, T 1:25–3:20. Warren 132. Professor Leagans.

SPECIAL STUDIES IN EXTENSION EDUCATION
(Education 621)

Fall. Credit two hours. Lectures, individual time to be arranged. Professor Leagans and Associate Professor Bruce.

SEMINAR: COMPARATIVE EXTENSION EDUCATION SYSTEMS
(Education 626)

Fall. Credit two hours. Open to graduate students and advanced undergraduates. Th 1:25–3:20. Warren 132. Professor Leagans.

SEMINAR: IMPLEMENTING EXTENSION AND COMMUNITY DEVELOPMENT PROGRAMS IN DEVELOPING COUNTRIES
(Education 627)

Spring. Credit two hours. Open to advanced students with experience in rural development programs by permission of the instructor. Th 1:25–3:20. Warren 132. Professor Leagans.

ENVIRONMENTAL QUALITY ENGINEERING
(Civil Engineering 2532)

Fall. Credit three hours. Open to noncivil engineering students.

INTRODUCTION TO HOSPITAL AND MEDICAL CARE ORGANIZATION
(Business and Public Administration 140)

Spring. Credit three hours. Associate Professor Battistella.

Health services are described and analyzed against the backdrop of recent political, social, and economic developments in the United States and Western Europe. For purposes of organization and understanding of forces for change, health services are viewed as a social system—the Medical Care System—organized along structural-functional lines. Alternative methods of organizing and financing health care services are examined in an effort to evaluate the capacity of the medical care system to respond to pressures generated by changing disease patterns and rising expectations for medical care. The roles and responsibilities of various institutions and professional groups are examined, with particular emphasis on the hospital as the central institution in the provision of community medical care. The process of community planning for health and welfare services is studied, and the relationship of the hospital to that process is analyzed.

INTRODUCTION TO CLINICAL MEDICINE AND PUBLIC HEALTH
(Business and Public Administration 141)

Spring. Credit three hours. Malott Hall. Mr. Samson.

The objective of this course is to familiarize the student with the principal diseases of modern life and to demonstrate how these conditions are controlled in individuals and in communities. Major emphasis is given to those conditions which directly affect the management of hospitals. Consideration is given to the training of physicians, medical and surgical specialists, nurses, and other personnel; the nature of specialized hospital equipment and other facilities for diagnosis and treatment; and the principal procedures used by physicians in diagnosis and treatment in hospitals and in their offices. Major public health problems of various parts of the contemporary world are discussed, and visits are made to nearby hospitals and medical centers at appropriate points in this course.

SOCIOLOGY OF COMMUNITY HEALTH CARE
(Business and Public Administration 142)

Spring. Credit three hours. Assistant Professor Smith.

The aim of this course is to provide future administrators, planners, and researchers with an introduction to social theory and research useful for the formulation and delivery of community health services. The course emphasizes

two major areas of consideration. The first concerns the significance of sociocultural and social-psychological factors for the initiation and utilization of health services. Specific topics covered include disease and its interpretation, sick role theory, the doctor-patient relationship, and the role of health care facilities and treatment patterns in bringing about behavioral change. The second major area emphasized in the course is that of the structure and dynamics of community decision making. Key topics in this area are community power structures and pathways to social change.

SEMINAR IN HEALTH RESEARCH
(Business and Public Administration 455)

Fall. Credit three hours. Malott Hall. Assistant Professor Smith.

The primary objective is to increase the student's ability to evaluate research reports and other studies, to assess their relevance for the field, and to formulate his own problems in a manner conducive to scientific investigation. An examination is made of the contributions of the social sciences and other disciplines to an understanding of current problems in the health field and in hospital administration in particular.

SEMINARS

NUTRITION

NUTRITION SEMINAR
(Graduate School of Nutrition 700)

Fall and spring. Credit one hour. Time to be arranged. Intended primarily for Graduate School of Nutrition students; it is recommended that they attend throughout the year. Professor Barnes and faculty.

SEMINAR IN HUMAN NUTRITION
(Human Nutrition and Food 515)

Spring. Credit three hours. Lectures, M W F 9:05. One discussion period per week to be arranged. Assistant Professor Devine.

Designed for graduate students with limited work in human nutrition and food. The seminar utilizes the lecture and discussion of Human Nutrition and Food 115A as a basis for supplemental readings and critical review of research on selected nutritional problems.

FIELD OF NUTRITION SEMINAR
(Graduate School of Nutrition 619; also Animal Science 619 and Poultry Science 619)

Fall and spring. No credit. M 4:30. Fall, Morrison 348. Spring, Savage 100. Lectures on current research in nutrition presented by visitors and faculty.

SEMINAR IN FOOD AND NUTRITION
(Human Nutrition and Food 605)

Fall and spring. Credit one hour each semester. T 4:30. Van Rensselaer NG-35. Department faculty.

BIOCHEMISTRY

RESEARCH SEMINAR IN BIOCHEMISTRY
(Biological Sciences 631–632)

Fall and spring. Credit two hours for two terms. Grades will be given at the end of the spring term. M 8–9:30 P.M. Savage 100. Professor Racker.

Required of all graduate students (except first-year students) majoring in biochemistry. The course may be repeated for credit.

BIOCHEMISTRY SEMINAR
(Biological Sciences 639)

Fall and spring. No credit. F 4:15. Riley-Robb 125. Faculty.

Lectures on current research in biochemistry presented by distinguished visitors and staff.

OTHER SEMINARS

FOOD SCIENCE SEMINAR
(Food Science 600)

Fall and spring. Time to be arranged. Stocking 204.

MICROBIOLOGY SEMINAR
(Biological Sciences 699)

Fall and spring. No credit. Open to all who are interested. Th 4:15. Riley-Robb 105. Staff.

SEMINAR: INTERNATIONAL AGRICULTURAL DEVELOPMENT
(International Agriculture 600)

Fall and spring. No credit. Third and fourth Wednesdays of month, 4:30. Emerson 135. Professor Turk and staff.

Primarily for graduate students interested in an integrated view of problems related to international agricultural development. Undergraduates with a specialization in international agriculture are encouraged to attend without registering. The seminar will focus on developing an understanding of the nature and interrelatedness to agricultural development of the social sciences, plant and animal sciences, foods and nutrition, and natural resources.

PHYSICAL BIOLOGY GRADUATE SEMINAR
(Veterinary Physical Biology 926)

Fall and spring. Credit one hour. Professor Comar and staff.

BIOLOGY AND SOCIETY
(Biology Sciences 201)

Fall and spring. Credit two hours per semester. S/U credit *only*. M 8:15 P.M. Discussion periods (one hour) to be arranged. Staff and invited speakers.

A series of public lectures dealing with a variety of topics concerning man as an individual, man as a member of society, and man as a member of the community of life on earth. The lectures are open to students and non-student members of the Cornell community as well as to other Ithaca-area residents. The purpose of the discussion period is to permit students to explore lecture material or related topics in depth.

Index of Courses

All courses are arranged numerically under the department or division offering the course.

General Index

CORNELL UNIVERSITY ANNOUNCEMENTS

The Cornell *Announcements* are designed to give prospective students and others information about the University. The prospective student should have a copy of the *Announcement of General Information;* after consulting that, he may wish to write for one or more of the following *Announcements:*

New York State College of Agriculture
College of Architecture, Art, and Planning
College of Arts and Sciences
Department of Asian Studies
Education
College of Engineering
School of Hotel Administration
New York State College of Human Ecology*
New York State School of Industrial and Labor Relations
Center for International Studies
Officer Education (ROTC)
Summer Session

Undergraduate preparation in a recognized college or university is required for admission to certain Cornell divisions, for which the following *Announcements* are available:

Graduate School: Biological Sciences
Graduate School: Humanities
Graduate School: Physical Sciences
Graduate School: Social Sciences
Law School
Veterinary College
Graduate School of Business and Public Administration
Graduate School of Nutrition
Medical College (New York City)
Cornell University–New York Hospital School of Nursing (New York City)
Graduate School of Medical Sciences (New York City)

Requests for the publications listed above may be addressed to
CORNELL UNIVERSITY ANNOUNCEMENTS
Edmund Ezra Day Hall, Ithaca, New York 14850

(The writer should include his zip code.)

*The Announcement of the College of Human Ecology (formerly Home Economics) will be available about April 23, 1970. Information needed earlier may be obtained by writing directly to the Committee on Admissions, Martha Van Rensselaer Hall, Cornell University, Ithaca, New York 14850.